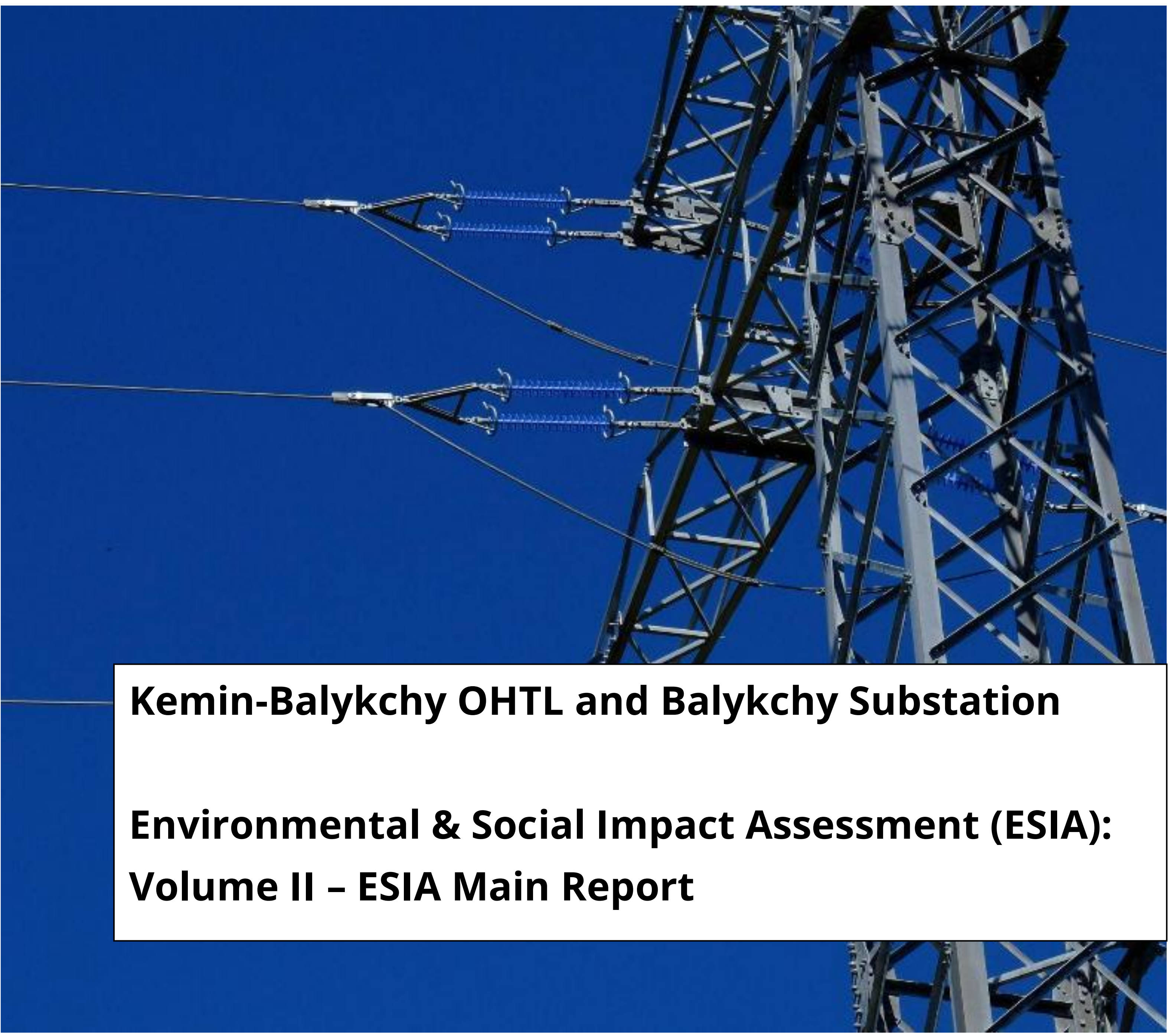

Kemin-Balykchy OHTL and Balykchy Substation

Environmental & Social Impact Assessment (ESIA): Volume II – ESIA Main Report

Consulting Firm:

Juru

Juru Ltd
Suite 1, One George Yard, London, United Kingdom, EC3V 9DF
www.juru.org

Prepared for:

Public Joint-Stock «National Electric Grid of Kyrgyzstan» (NEGK)
Principal office: Zhibek Zholu Avenue, 326, Bishkek Kyrgyz Republic, 720070
www.nesk.kg

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Abbreviations

AOI	Area of Influence
AOO	Area of Occupancy
BMP	Biodiversity Management Plan
CED	Convention for the Protection of All Persons from Enforced Disappearance
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
CF	Chance Find
CH	Critical Habitat
CHA	Critical Habitat Assessment
CHS	Community Health and Safety
CHSS	Community Health, Safety and Security
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLO	Community Liaison Officer
CESE	Centre for Sanitary and Epidemiological Supervision
E&S	Environmental and Social
EAAA	Ecologically Appropriate Area of Analysis
EBRD	European Bank for Reconstruction and Development
ECS	Environmental Consequences Statement
EE	Ecological Expertise
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMF	Electromagnetic field
EMS	Environmental Management System
EOO	Extent of Occurrence
EPC	Engineering, Procurement, and Construction
EPR	Extended Producer Responsibility
EPRP	Emergency Preparedness and Response Plan
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
EU	European Union
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FPIC	Free Prior Informed Consent
GBV	Gender Based Violence
GIIP	Good International Industry Practice
GIP	Good International Practice
GM	Grievance Mechanism
H&S	Health and Safety
HR	Human Resources
IBA	Important Bird Area
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ICNL	International Center for Non-For-Profit Law

IFC	International Finance Corporation
ILO	International Labour Organisation
IP	Indigenous People
IRA	Internationally Recognized Area
IUCN	International Union for Conservation of Nature
JSC	Joint-Stock Company
K-B	Kemin-Balykchy
KBA	Key Biodiversity Area
KII	Key Informative Interview
LARF	Land Acquisition and Livelihood Restoration Framework
LLC	Limited Liability Company
LPA	Legally Protected Areas
LRP	Livelihood Restoration Plan
MNRETS	Ministry of Natural Resources, Ecology, and Technical Supervision of the Republic of Kyrgyzstan
MoE	Ministry of Energy of the Kyrgyz Republic
MPC	Maximum Permissible Concentration
MSW	Municipal Solid Waste
NABU	Nature And Biodiversity Conservation Union
NEGK	National Electric Grid of Kyrgyzstan
NGO	Non-Governmental Organisation
NSR	Noise Sensitive Receptors
NTS	Non-Technical Summary
O&M	Operation and Maintenance
ODIHR	Office for Democratic Institutions and Human Rights
OHS	Occupational Health and Safety
OHL	Overhead line
OHTL	Overhead transmission line
OPCAT	Optional Protocol to the Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment
OPWG	Optical Ground Wire
PAP	Project Affected People
PBF	Priority Biodiversity Features
PCD	Public Consultation and Disclosure
PIU	Project Implementation Unit
PJSC	Public Joint-Stock Company
PM	Particulate Matter
POPs	Persistent Organic Pollutants
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PR	Performance Requirement
PV	Photovoltaic
RDB	Red Data Book
RES	Renewable Energy Source
RoW	Rights of Way
SanPiN	Sanitary and Epidemiological Rules and Standards
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SG	Sanitary Gap

SPZ	Sanitary Protection Zone
TPC	Tentatively Permissible Concentration
SCADA	Supervisory control and data acquisition
SCNS	State Committee for National Security
SS	Substation
ToR	Terms of Reference
TSO	Transmission System Operator
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VP	Vantage Point
WBG	World Bank Group
WHO	World Health Organisation
WPZ	Water Protection Zone
ZVI	Zone of Visual Influence

1 Introduction

1.1 Background

The European Bank for Reconstruction and Development ("EBRD") is considering providing a sovereign loan to the Public Joint-Stock Company National Electric Grid of Kyrgyz Republic ("PJSC NEGK") to finance the construction of an approximate 53 km 500 kV overhead transmission line (OHTL) in Kyrgyz Republic between the existing Kemin substation (SS) in Chui region and a new substation named "Balykchy, SS" , 6.4 kilometres outside Balykchy city in the Issyk-Kul region (see Figure 1).

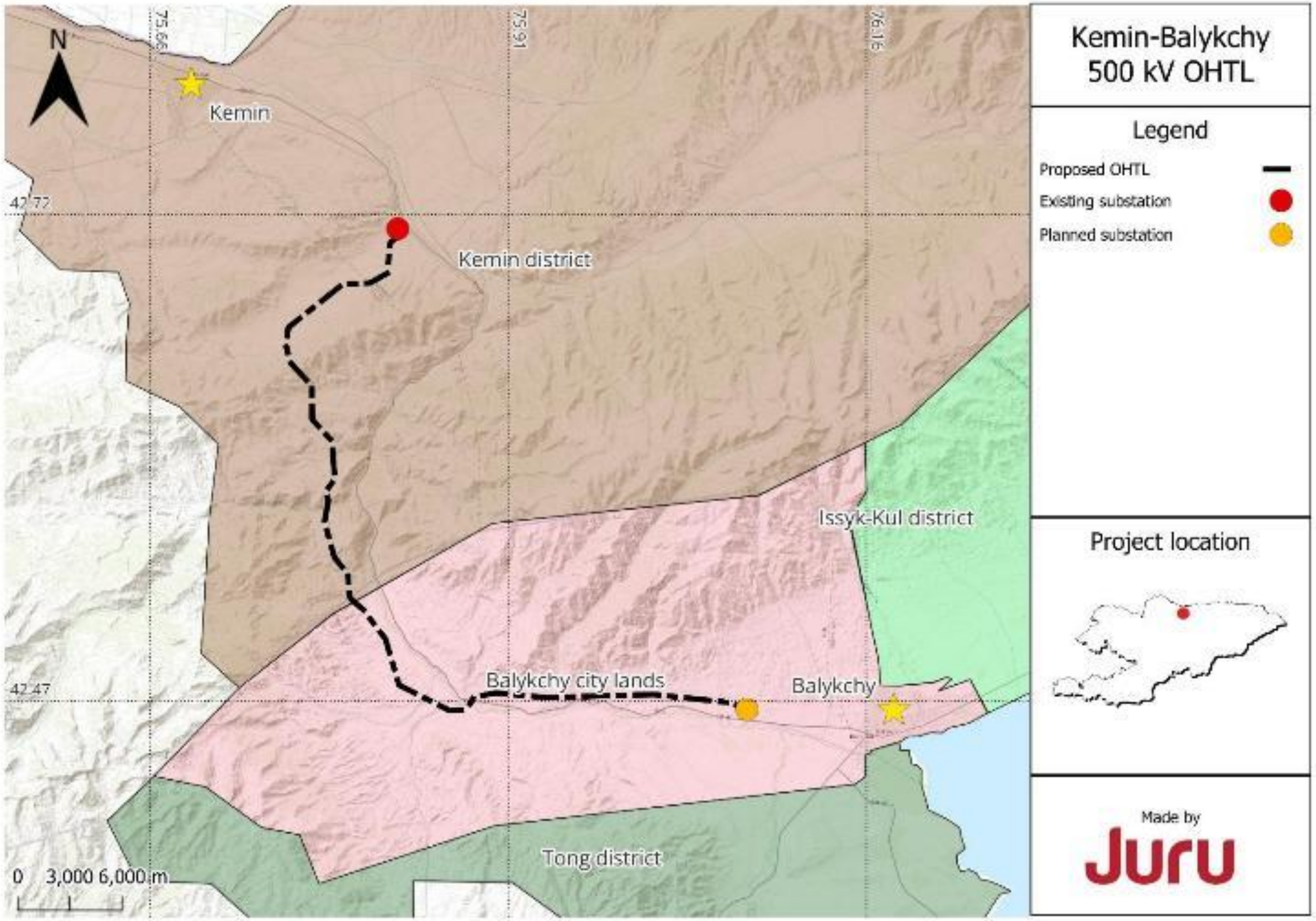
The Project's primary purpose is to facilitate the evacuation of electricity generated by renewable energy power plants under development to the national power grid. Implementing the Project will also significantly improve the transmission networks' reliability, efficiency, stability, quality and security of the electricity supply.

EBRD Environmental and Social Policy (ESP) (2019), Appendix 2 "Category A Projects" (paragraph 24) makes specific reference to the "construction of high voltage overhead electrical power lines" as a project with the potential to generate significant adverse E&S impacts. Considering Appendix 2, the Project is categorised as Category "A". Category A projects require a comprehensive Environmental and Social Impact Assessment (ESIA) and review of associated documents, followed by public disclosure of key documents for a minimum of 120 days. This requirement aligns with the EU EIA Directive requirements for Annex I projects.

The EBRD has appointed Juru Ltd. ("Juru" or the "ESIA Consultant") to perform the ESIA for the Project following EBRD Environmental and Social Policy 2019 (ESP 2019) and supporting Performance Requirements (PRs). Juru is supported by "Evidence CA", a local social consulting and research organisation.

According to the Law of the Kyrgyz Republic "On Environmental Protection" dated June 16, 1999, No. 53 for projects of this type, it is required to conduct an environmental impact assessment (EIA) when designing economic activity facilities. The categorization of facilities is carried out following Appendix 2 of the Law of the Kyrgyz Republic dated May 8, 2009, No. 151 "General Technical Regulation on Ensuring Environmental Safety in the Kyrgyz Republic," based on the calculation of expected impacts using the provided formula, which is performed during the development of the EIA. Juru Ltd will also prepare the national pre-EIA as part of the feasibility study.

Figure 1: Project overview



1.2 Purpose of this ESIA

The purpose of this ESIA is to:

- Identify and evaluate potential environmental and social impacts that the Project may have on the environment and communities within its area of influence (AOI) (positive and negative).
- Avoid, or where avoidance is not possible, minimize, mitigate, or compensate adverse environmental or social impacts and issues to workers, affected communities and persons, and the environment from project activities, including involuntary resettlement impacts.
- Implement a systematic approach to stakeholder engagement to build and maintain a constructive relationship with stakeholders, particularly the directly affected communities.
- Determine whether there are any involuntary resettlement impacts (e.g., land acquisition, displacement; and ascertain any adverse impacts on livelihoods for the local population).
- Define environmental and social management requirements through the effective use of environmental and social management plan (ESMP) and relevant resettlement documentation.
- Align with national requirements for environmental and social impact assessment.
- Demonstrate compliance with Lender requirements.

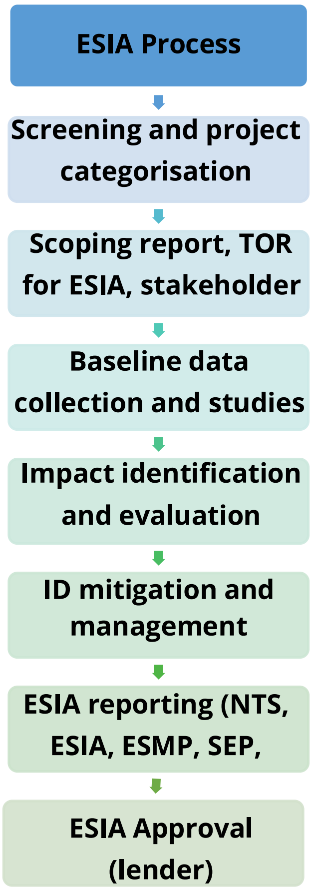
1.3 Project proponent

PJSK NEGK was established following the Program for Denationalization and Privatization of State Property in the Kyrgyz Republic for 1998–2000 due to the restructuring of the former operator of the country's energy infrastructure, PJSK "Kyrgyzenergo." PJSK NEGK operates as an independent joint-stock company; however, the state currently participates in its ownership structure through the Ministry of Energy (MoE) of the Kyrgyz Republic and the Ministry of Finance of the Kyrgyz Republic. The company's main activities are the operation and development of the primary electric networks of the Kyrgyz Republic, the supply of electricity through the main electric, the implementation of interstate transit, and cooperation with the electric power systems in neighbouring countries.

1.4 ESIA approach

The sequence of steps for the ESIA study is presented in Figure 2. Stakeholder engagement has been performed throughout the ESIA process and is summarised in Chapter 5. A stakeholder engagement plan (SEP) and evidence of stakeholder engagement performed are provided in Volume V.

Figure 2: ESIA process – sequence of steps (source: Juru)



A scoping exercise was completed in January 2025 to define the ESIA terms of reference (TOR). The scoping report and ESIA TOR are provided in Volume III – Technical Appendices.

Field surveys were performed between March 2024 and May 2025 and included the following:

Biodiversity surveys

- Botany (14-18 September 2024; 27-29 April 2025)
- Mammal camera trapping (November 2024 – April 2025)
- Mammal transect surveys (3-6 April 2025)
- Herpetological (20-23 September 2024; 24-25 April 2025)
- Fish (27 – 29 March 2025)
- Vantage point bird (27 March – 10 May 2024; 4-11 November 2024; 20 March – 14 April 2025)
- Raptor nest (16 days between May-August 2024; 3-6 April 2025)
- Breeding bird (26 April – 22 May 2024)
- Bat roost (16-17 April 2025)

Environmental surveys

- Air quality and noise (16 – 20 November 2024; 13-17 April 2025)
- Surface and ground water and soil collection (14 – 15 November 2024; 3 April 2025)

Social surveys

- Socio-economic survey (3 – 11 April 2025)
- Focus group discussions, key informant interviews (3 - 7 April)
- Traffic survey (17- 19 November 2024; 12-14 April 2025)

Baseline survey reports are provided in Volume III – Technical Appendices. Mitigation and management measures identified in the impact assessment chapters have been collated into a Project environmental and social management plan (ESMP) for implementation across subsequent phases of the development cycle.

1.5 ESIA structure

The ESIA contains the following volumes:

- Volume I: Non-Technical Summary (EN, RU, KG)
- Volume II: ESIA Main Report (this document) (EN, RU)
- Volume III: ESIA Technical Appendices (originating language), including:
    - Kemin-Balykchy scoping report and ESIA TOR
    - Critical Habitat Assessment
    - Noise and Air Quality baseline survey reports
    - Soil and water assessment report
    - Traffic count report
    - VP Bird Monitoring report (Spring 2025)
    - Raptor nesting survey report (Spring 2025)
    - Mammal survey report (Spring 2025)
    - Reptile survey report (Spring 2025)
    - Bat roost survey report (Spring 2025)
    - Fish survey (Spring 2025)
    - VP Bird Monitoring report (Autumn 2024)
    - VP Bird Monitoring report (Spring 2024)
    - Raptor nesting survey report
    - Botanical report
    - Breeding bird survey near Issyk Kul report Spring 2024
    - Waterbird winter survey report
    - Canyon visual survey report
    - Archaeological Field Studies
- Volume IV: Framework Environmental and Social Management Plan (ESMP) (EN, RU)
- Volume V: Livelihood Acquisition and Livelihood Restoration Framework (LARF) (EN, RU) including separate non-technical summary (KG)
- Volume VI: Stakeholder Engagement Plan (SEP) with supporting Public Consultation and Disclosure (PCD) Report (EN, RU), supporting meeting records and ESIA disclosure meeting report

This ESIA report is structured as follows:

- Chapter 1: Introduction
- Chapter 2: Policy, legislative and institutional overview
- Chapter 3: Project description
- Chapter 4: Baseline conditions
- Chapter 5: Stakeholder engagement
- Chapter 6: ESIA methodology
- Chapter 7: Impact assessment (sections 7.1 to 7.15)
- Chapter 8: Environmental and social management
- Chapter 9: Conclusion and summary of impacts

1.6 ESIA schedule

The current ESIA project schedule is provided in Table 1.

Table 1: Project schedule

Activity	Date
Project Categorisation	September 2024 (completed)
Scoping	January 2025 (completed)
Consultation on draft ESIA	June 2025 (completed)
Finalization of the Submission of the draft ESIA	July 2025 (completed)
EBRD 120-day disclosure period	Mid-July to Mid-October 2025
Finalise ESIA (including public consultation comments)	October 2025
Financial close	Q4 2025 (immediately after signing)
Pre-mobilisation (finalisation of route corridor, tower micro-siting, planning and design)	Q1 2026
Construction Start	Q1 2026
Construction End	Q1 2027
Expected Lifetime	Approximately 50 years or more

1.7 ESIA team and project contact information

Contact information for questions or grievances is provided in Table 2. Juru will perform the ESIA study. The team of Juru's specialists involved in the Project are presented in *Table 3*.

Table 2: Project contact information shared in leaflets

Juru/ Evidence CA	NEGK
Name: Bermet Alieva **Address:** 61, Kulatova Str., Bishkek, Kyrgyz Republic, 720017 **Email:** Bermet.alieva@gmail.com **Phone:** +996 551 99 99 84	**Name:** Department of External Relations and Project Implementation **Email:** 1piunegk@gmail.com **Phone:** +996 312 67 03 19

Table 3: ESIA Team

Name	Position
Nicola Davies	Project Manager & Environmental Specialist
Caleb Gordon	International Biodiversity Lead
Marianne Lupton	International Social Lead
Oleg Khegay	Local Environmental Specialist
Danila Avdulov	Local Environmental/ Baseline Specialist
Gulchekhra Nematullaeva	Social Expert
Murod Berdimurodov	Social specialist
Mokhinur Zokirova	Social specialist
Maxim Koshkin	Local Biodiversity Expert / Zoologist
Azamat Sultamuratov	Botanist

2 Project Description

2.1 Needs case

Kyrgyzstan uses 500kV overhead lines (OHL) primarily for two reasons: to facilitate regional integration and to enhance energy security and independence. The Datka-Kemin 500kV transmission project, for example, provides a direct route for power transmission from hydropower plants in the southwest to Bishkek, the capital in the northeast, without routing through Uzbekistan. Currently, hydropower is the primary source of electricity in the Kyrgyz Republic, accounting for approximately 90% of annual production. However, about 80% of the energy system infrastructure is deteriorated and requires modernization.

The region's power grid is currently served by 220 kV transmission lines, which are insufficient for energy transportation and have significant challenges, including:

- Ageing infrastructure: many substations and transmission lines have exceeded their operational life, leading to inefficiencies and frequent outages.
- Load growth and grid overloads: increasing electricity demand, particularly in winter, has caused up to 45-53% of overloads during peak periods.
- Cross-border power exchanges: while NEGK plays a key role in regional trade through CAPS, the system's reliability is affected by neighbouring networks.

In 2019, the Kyrgyz Republic adopted the Green Economy Development Program of the Kyrgyz Republic for 2019-2023, prioritising green energy. As part of this program, funding was secured for the development of wind and solar energy. According to the Kyrgyz Republic Investment Portal, work is already underway in the Issyk-Kul region on the design and/or construction of a solar power plant and a wind farm within a 50-kilometre radius of the city of Balykchy, with a budget exceeding USD 200 million[1]. The Issyk-Kul – Balykchy region is one of the highest average daily PV OUT in the country2. The power generated by the solar power plants can be sold to local infrastructure, coal deposits, industries and various workshops operating in the respective region. The Project will be built to support the development of large renewable power plants in the Issyk-Kul – Balykchy region.

At the same time, the country is experiencing a sharp increase in electricity consumption. According to UN statistics, the population of the Kyrgyz Republic is expected to grow significantly. Between 2010 and 2020, total consumption rose 72%, driven primarily by a dramatic 170% increase in residential sector consumption[3].

1https://invest.gov.kg/investmap/map.xhtml?lang=ru#

2 Ministry of Energy of the Kyrgyz Republic – Top Solar Energy Zones

3https://iea.blob.core.windows.net/assets/e3dc71d9-a1f8-40bf-a6d6-b7b4ed9fa37a/StrengtheningPowerSystemSecurityinKyrgyzstan_ARoadmap.pdf

Since the Chui region and Bishkek are the most densely populated areas in the Kyrgyz Republic, they are the priority for connection to new capacity. Previously, the Kemin substation in the Kemin district of the Chui region was constructed to receive 500 kV lines. However, the Issyk-Kul region currently lacks such a substation.

Constructing a transmission line between the existing Kemin substation and Balykchy in the Issyk-Kul region would deliver electricity from planned green energy facilities to densely populated areas, provide redundancy for existing lines in emergencies, and significantly increase the overall grid transmission capacity. The OHTL is an integral part of a broader program supporting the integration of renewable energy sources into the national grid and, specifically, the integration of renewables in the northwestern region. This needs case will be elaborated in the ESIA to show the current and planned development projects for which this OHTL plays a strategic role in the overall upgrades. Figure 3, Figure 4, and Figure 5 illustrate the predicted population growth, and power generation and consumption.

Figure 3: Kyrgyzstan population growth forecast (source: World Population Prospects 2022)

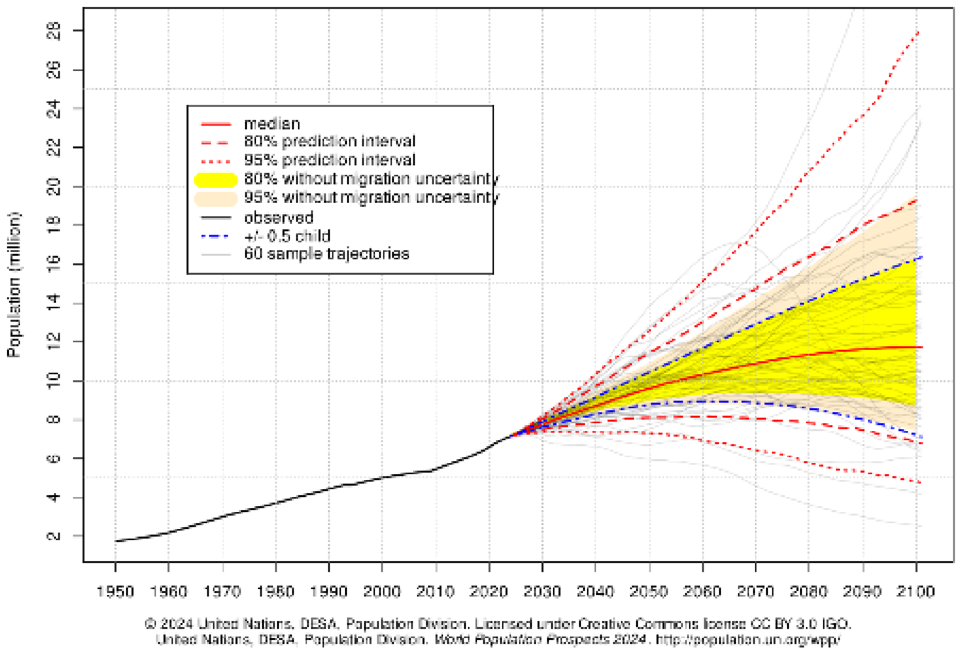


Figure 4: Kyrgyzstan population growth rate (source: World Population Prospects 2022)

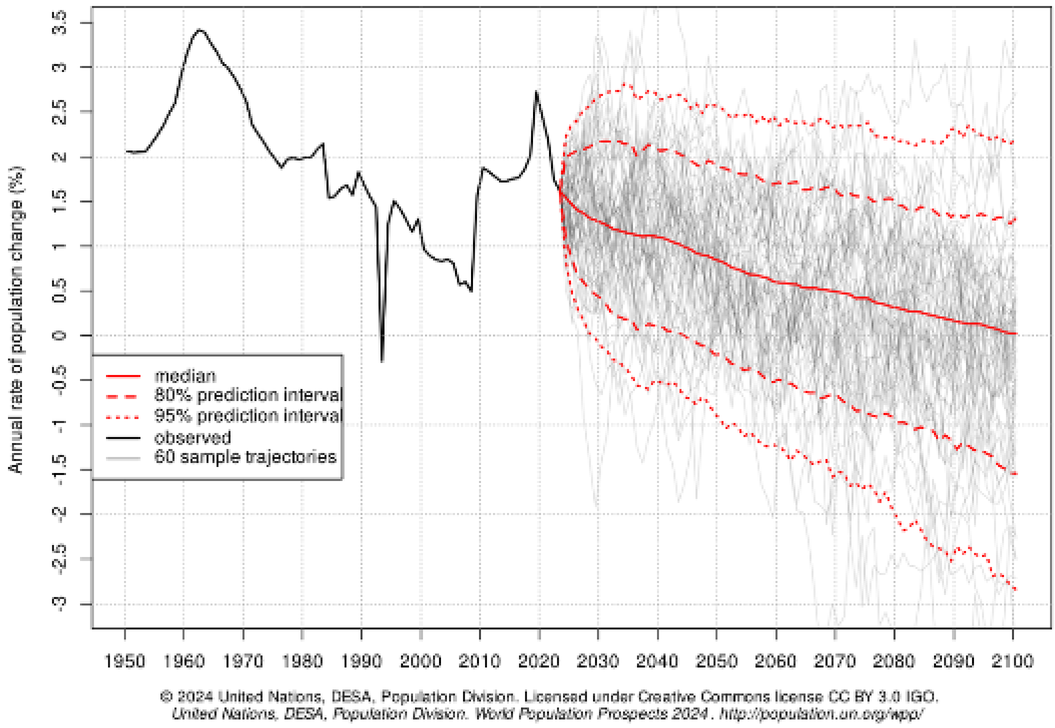
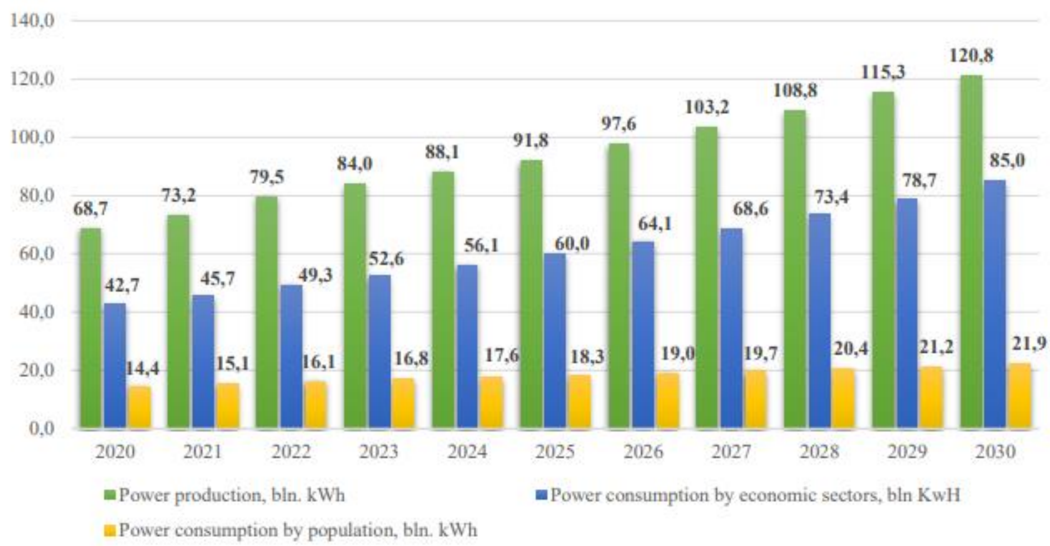
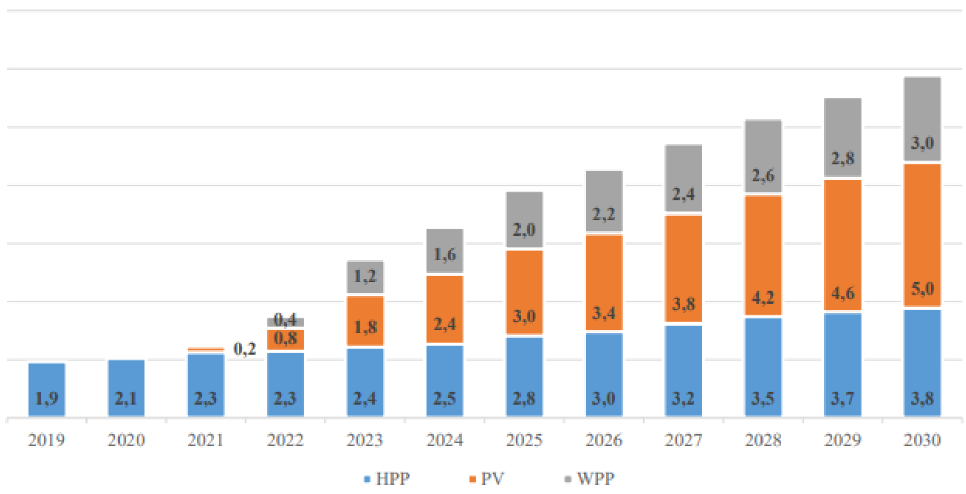


Figure 5: Electrical power generation and consumption outlook by 2030, In kWh (source: CONCEPT NOTE FOR ENSURING ELECTRICITY SUPPLY IN KYRGYZSTAN IN 2020-2030)

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2023
2024
2025
2026
2027
2028
2029
2030
HPP
PV
WPP

2.2 Project location

The Kyrgyz Republic is divided into seven regions (oblasts) administered by appointed governors. Each region comprises several districts (raions), administered by government-appointed officials. Sub-districts are self-governing, rural ayil administrations (ayil okmotu), consisting of up to 20 small settlements (ayils), have their own elected mayors and councils.[4]

Ayils (the smallest population unit) are grouped into ayil aimaks (which includes several ayils) and local government offices that manage the ayil aimak are called ayil okmotus. They manage things like local schools, village roads, water supply, public safety and land and farming issues.

The Project OHTL route crosses the regions of Chui and Issyk-Kul. The Chui Region comprises eight districts (Alamudun, Chui, Jayyl, Kemin, Moskva, Panfilov, Sokulov and Ysyk-Ata) and the city of Tokmok. The Issyk-Kul Region comprises five districts (Ak-Suu, Jeti-Oguz, Ton, Tup and Issyk-Kul) and two cities, Karakol and Balykchy. The districts that are impacted by the Project are

- Kemin district (Chui region),
- Balykchy city (Issyk-Kul region).

Four ayils are situated in close proximity to the OHTL route – two of them fall under the administration of the Kyzyl-Oktyabr ayil okmotu and Balykchy city mayor's office. The ayils - Kok-Moynok 1 and Kok-Moynok 2, which fall under the control of the Balykchy city, are situated approximately 1 km and 17 km, respectively from the planned Balykchy substation. The third ayil is Cholok, located about 150-200 m from Kemin substation and the final Kyz-Kiya ayil, situated 6 km away from OHTL line, falls under the control of the Kyzyl-Oktyabr ayil okmotu. The proposed OHTL line crosses the pasture lands within the jurisdiction of Orlovka and Balykchy cities as well as Kyzyl-Oktyabr ayil aimak.

From the Kemin SS the OHTL heads west into the mountains routing to the south of the planned solar PV Project (by LLC "Eco Energy"). The route broadly follows an unpaved gravel road and existing 500kV OHTL ("Datka-Kemin") southwest crossing the existing 220 kV lines "Kemin-Issyk-Kulskaya-1" and "Kemin-Issyk-Kulskaya-2", as it passes through the mountains to the village of Kok-Moynok-2. At this point the OHTL ROW crosses the Bailamtal River and the follows a similar alignment as to "Bishkek-Torugart" highway for 16 km to the new Balykchy SS approximately 6 km outside Balykchy, refer to Figure 6. The terrain along route is hilly, with sharp elevation changes ranging from 1,286 to 2,407 meters above sea level.

The site for the new substation located near Balykchy is shown in Figure 11. The site is described as arid or semi-arid, with sparse vegetation consisting of small shrubs and dry grasses as shown in Figure 33. A full description of the ecological baseline is provided in Chapter 4.3.

[4] https://www.adaptation-fund.org/wp-content/uploads/2020/10/AFB.PPRC_.26.b.8-Proposal-for-Kyrgyzstan.pdf

Figure 6: General Project Location

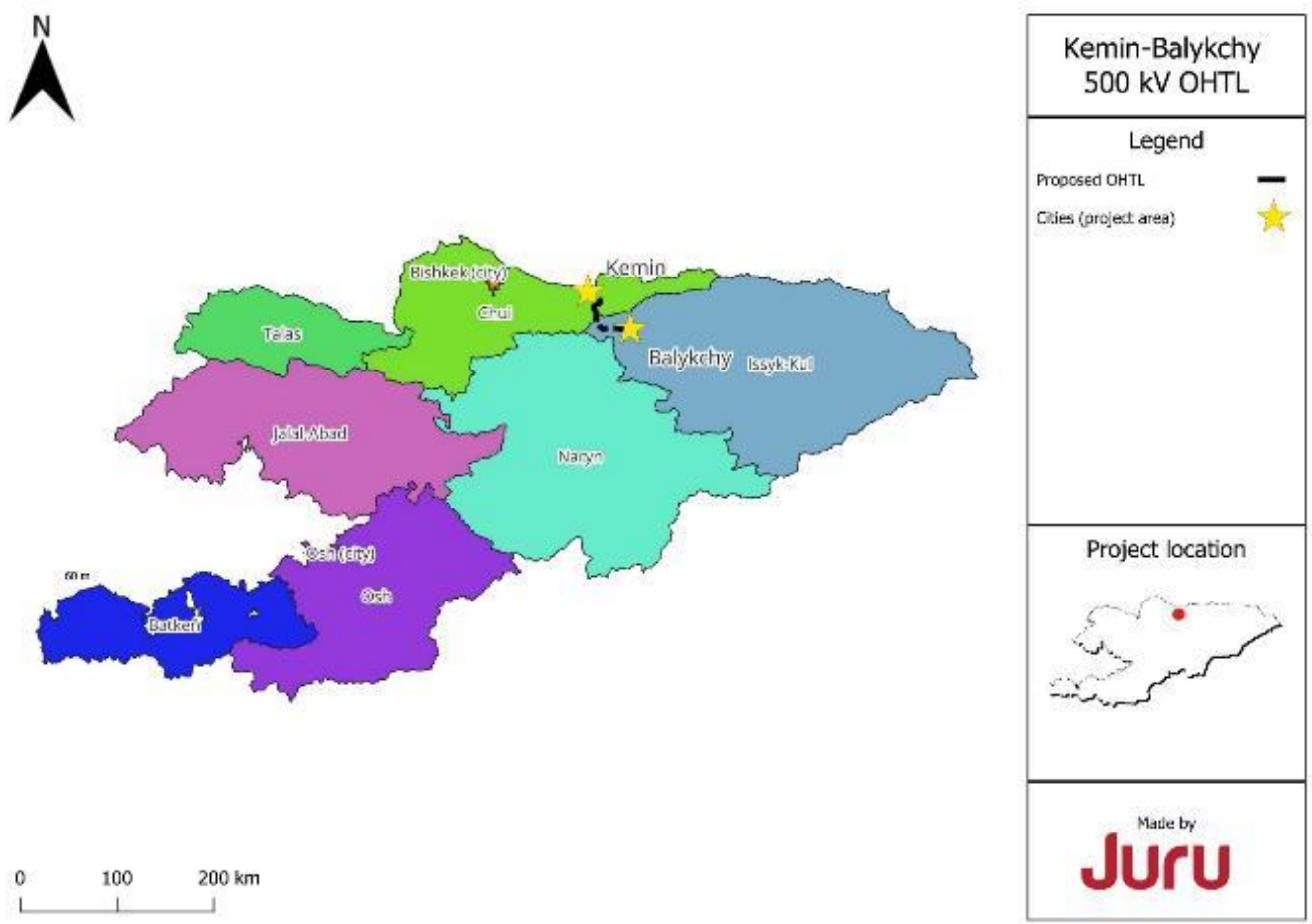
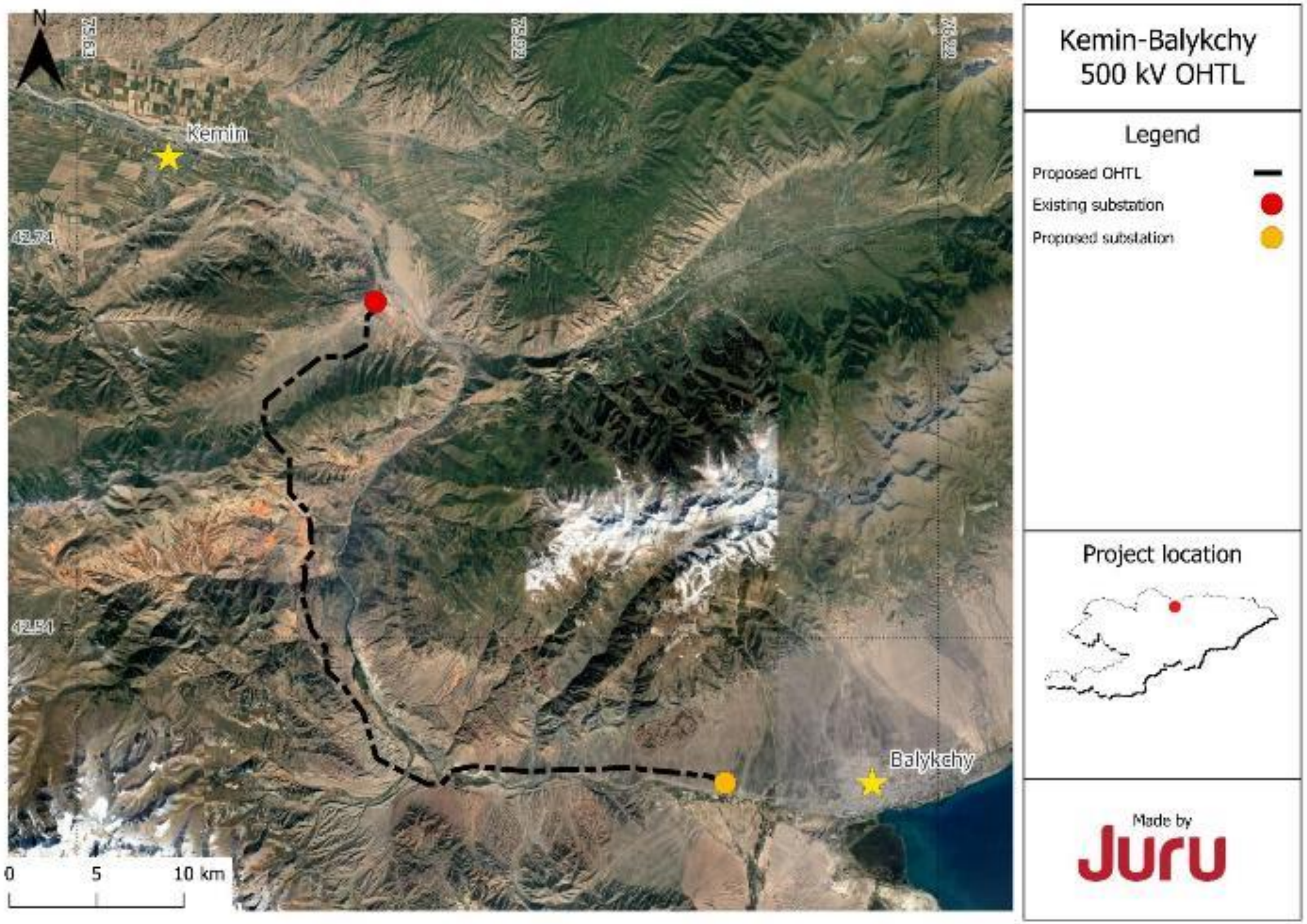


Figure 7: Proposed PHTL Routing



2.3 Project summary

The primary components of the K-B OHTL and substation Project are:

- 52.9 km of 500kV OHTL between the settlements of Cholok (Chui region, 13 km from Kemin city) and a new substation (Balykchy) near Kok-Moynok-1 settlement, (Issyk-Kul region, 6 km away from Balykchy city)

Related activities in support of the OHTL works will include:

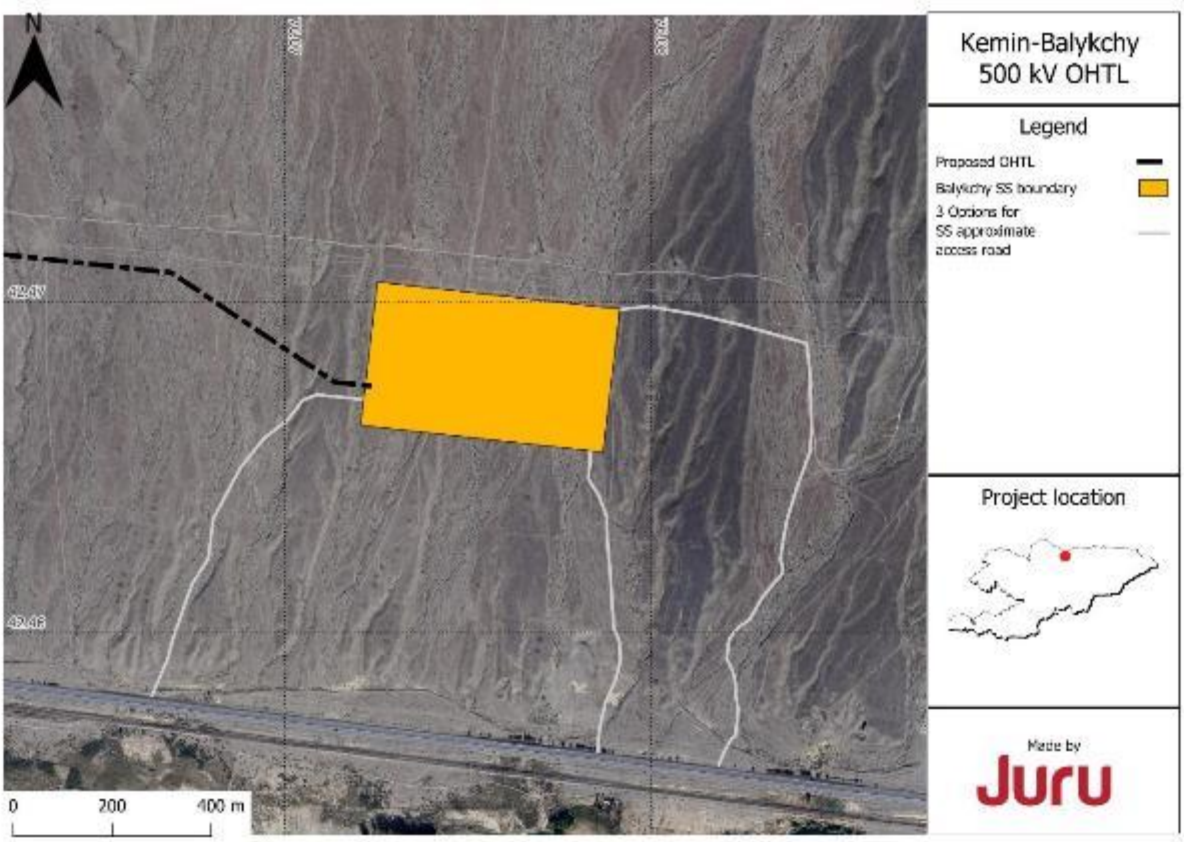
- End-user works at the Kemin SS - the connection is expected to be within an existing reserve bay within the current substation footprint (Figure 8 and Figure 9)
- New 14.3 ha standalone substation - Balykchy SS
- 78 m servitude under the OHTL (including the area for tower footprint, and the health protection set back of 30 m on either side of the outermost conductor).
- Upgrades to existing access routes (gravel) or new access routes (gravel) suitable to provide access to the OHTL ROW and new substation.

Figure 8: Spare bay for the 500 kV Kemin-Balykchy OHTL in the Kemin substation (source: Kemin Balykchy inception report, December 2024)

Figure 9: Connection from the Existing 500/220/35kV Kemin Substation

Figure 10: Existing Kemin SS (Source: Juru)

Figure 11: Location of the new Balykchy SS (Source: Juru).



The coordinates of the Project are provided in Table 4.

Table 4: Kemin-Balykchy OHTL preliminary coordinates

Northing (Y)	Easting (X)
42.71250	75.83514
42.71140	75.83646
42.70550	75.82740
42.68998	75.82565
42.68484	75.81316
42.68431	75.79448
42.66211	75.75637
42.65293	75.75468
42.64413	75.75766
42.63203	75.77274
42.61477	75.77300
42.60454	75.78581
42.59970	75.78719
42.58423	75.78882
42.57781	75.78249
42.57321	75.78434
42.56209	75.78159
42.54392	75.78848
42.53513	75.79805
42.52391	75.79896
42.52212	75.80051
42.51575	75.81047
42.51312	75.81253
42.50188	75.82416
42.47813	75.83365
42.46494	75.86909
42.46543	75.87950
42.46901	75.88393
42,47182	75.88562
42,47410	75.90114
42.47164	75.93699
42.47329	76.01145
42.46893	76.06681
42.46694	76.07083
42.46686	76.07187

Table 5: Balykchy substation preliminary coordinates

Northing (Y)	Easting (X)
42.46616	76.07146
42.46567	76.07741
42.46827	76.07782
42.46875	76.07187

2.4 Project receptors

Within the two-kilometer buffer of the OHTL route, human, ecological and other receptors have been identified. These are shown in Figure 12.

AOI Communities along the OHTL ROW are Kok-Moynok-1 and Kok-Moynok-2 (included into Balykchy city), and Cholok village (Kemin district).

The remaining receptors are divided into several clusters: a residential cluster, which includes scattered individual houses; a farming cluster; and a commercial cluster. In addition to the clusters, individual roadside shops, a fish pond currently under construction south of the village of Kok-Moynok-2, and the Nature And Biodiversity Conservation Union (NABU) animal rehabilitation centre have been identified. An explanation of the receptors along the OHTL ROW are presented in Table 6 below.

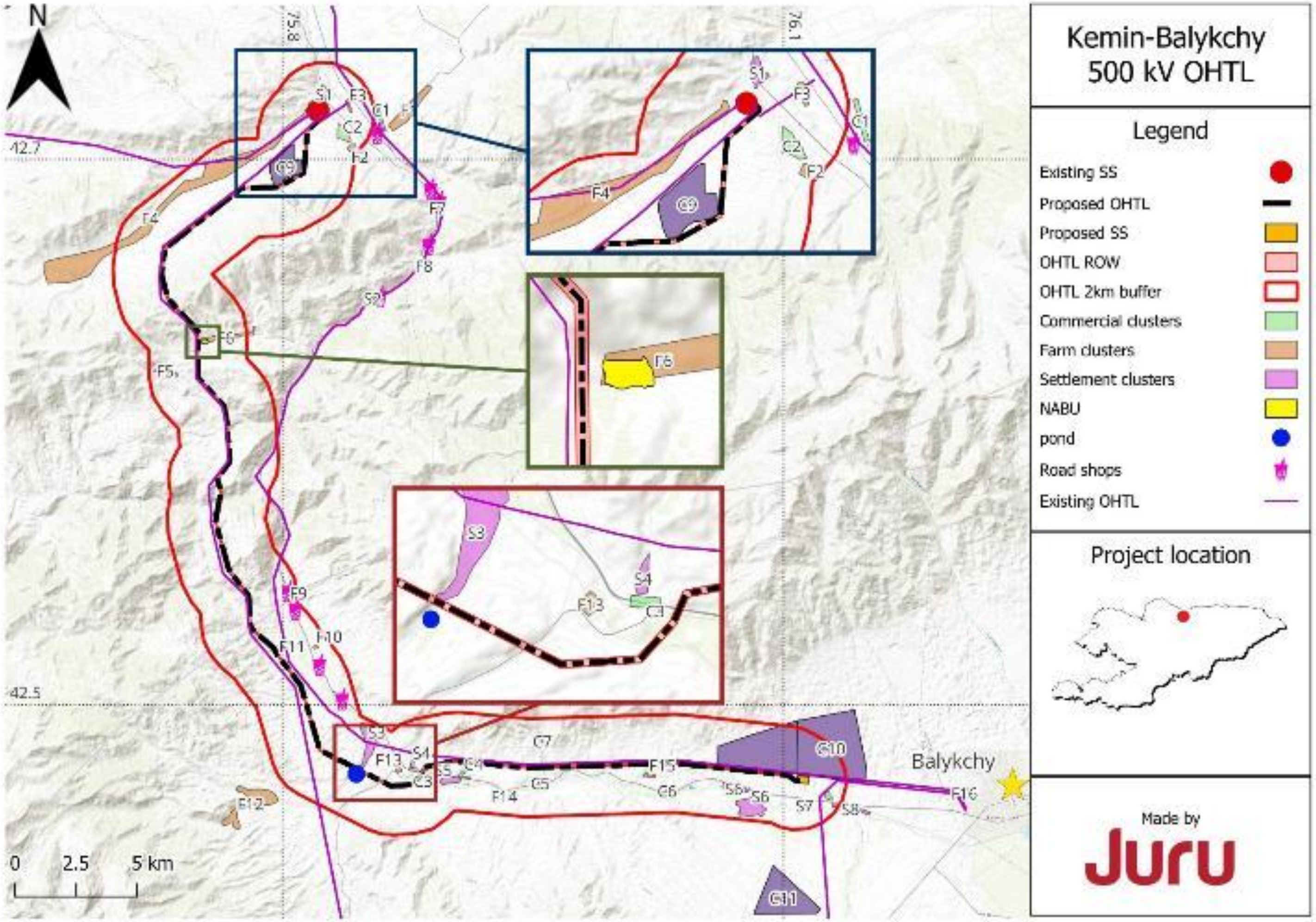
Table 6: Receptors within OHTL AOI

Cluster number	Description
C1	Construction material production facility (Figure 19)
C2	Cement plant
C3	Clusters of roadside shops (Figure 15)
C4	Brick production facility (Figure 18)
C5 – C6	Trade (construction materials)
C7	Fish farming facilities (Kiymat-Kur-Kol river)
C8	Cement plant
C9	Proposed Solar PV land plont
C10	Construction camps for a solar power plant
C11	Construction camps for a wind power plant
S1	Cholok village (Figure 13)
S2	Kiz-Kiya village
S3 – S5	Kok-Moynok-2 village (Figure 14)
S6 – S8	Kok-Moynok-1 village (Figure 14)
F1 – F16	Clusters of farms (Figure 16)
NABU	NABU Wildlife rehabilitation centre
HH	herder's houses with stables were identified near to the Project ROW

The proposed route requires the following crossings with natural features or existing infrastructure:

- Railway crossing.
- Crossing of the Chu River or its tributaries at 6 locations
- Multiple crossings of existing 220 kV overhead line (IssikKul-1, IssikKul-2 and Zapadnaya OHTL).
- Road crossings (EM11, EM23 and more minor local roads).

Figure 12: Receptor map



A full description of the baseline environmental and socio-economic baseline along the OHTL ROW is provided in Chapter 4.

Figure 13: Cholok villages

Figure 14: Kok-Moynok-2, Kok-Moynok-1 villages

Figure 15: Road shops and cafes along EM11

Figure 16: Example of stand-alone farmstead and households (mountain area)

Figure 17: Existing OHTL and railway along EM11

Figure 18: Brick factory (C4)

Figure 19: Factories (C1)

Figure 20: Landscapes along the OHTL route (mountain areas)

Figure 21: View over the new Balykchy substation site

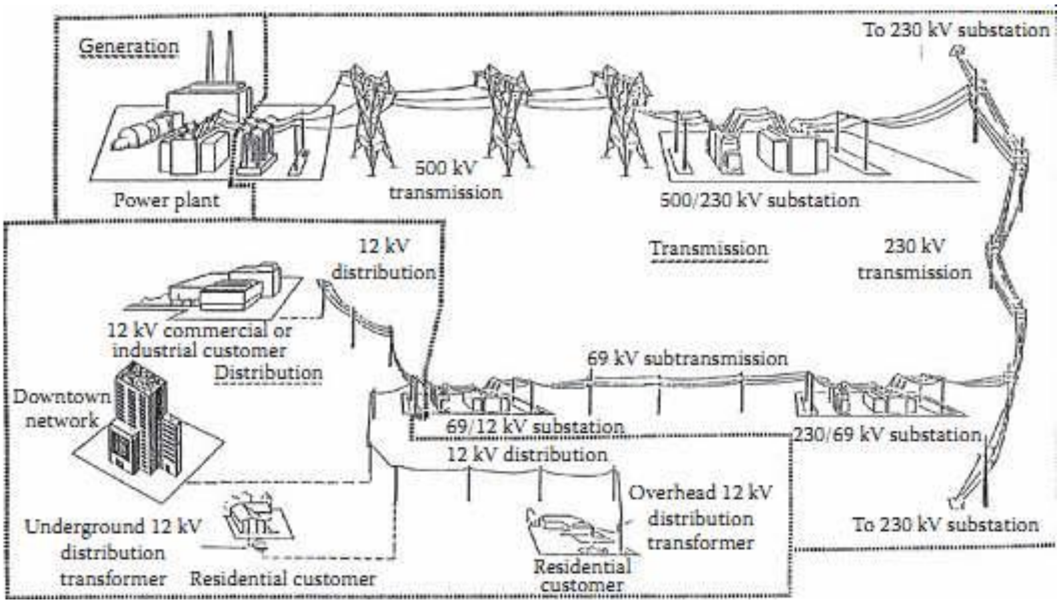
Figure 22: Existing line and unpaved gravel road.

2.5 Project components

2.5.1 Concept of energy transmission

Figure 23 illustrates the key features of a typical energy transmission and distribution system. The generating station produces electric energy at around 15-25 kV. At the generating station, a transformer is used to increase ("step up") the voltage to a voltage more appropriate for transmission (e.g., 500 kV as for this Project). The higher the voltage, the less energy loss is incurred during transmission. In the Kyrgyz Republic, 500 kV OHTL transmits electricity between 500 kV substations. At these substations, energy may then be stepped down to 220 kV for transmission at a more regional level and then to even lower voltages for distribution around cities, from which it is reduced to 110 kV for distribution along streets and then finally to 240/110V to supply homes.

Figure 23: Concept of electric energy transmission[5]



5 http://www.industrial-electronics.com/elec_pwr_3e_9.html

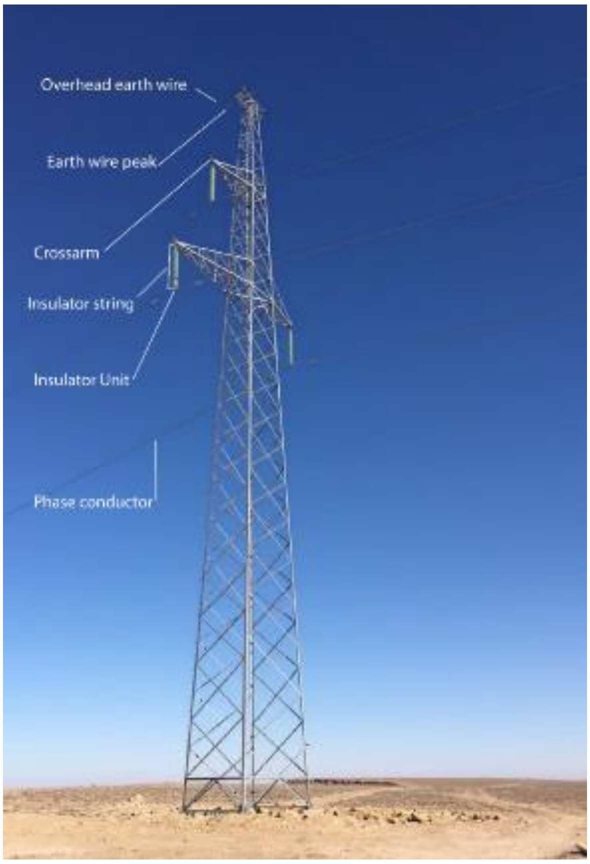
2.5.2 Main components

The main components of an OHTL are the towers, foundations, insulators, conductors (wires), and earth wire, as shown in Figure 24. All components will be designed following the relevant statutes and norms of the Kyrgyz Republic and GIP. A summary of the key characteristics of the OHTL is provided in Table 7. A final decision on many technology choices, e.g., the type of OHTL tower or the number of towers, has not been made. Where the final decision may affect the potential E&S impacts, this is noted in the impact assessment chapters, otherwise, it is considered that the final design alternatives have an equal effect from an E&S impact perspective.

Table 7: Summary of OHTL characteristics

Feature	Description
Circuit type	Single
Number of phases	3
Approximate length of OHTL	52.9 km
Elevations along the route, m ASL (meters above sea level)	1,286 to 2,407
Total length of new access road	Estimated between 50km to 70km (worst case estimate)
Tower Type	PB5, PB4, R2, U1, U2k
Tower height	24.3 to 38 m
Typical Span / Maximum span	250 m to 350 m / 1000m
Optical Ground Wire (OPGW)	Yes

Figure 24: Components of an OHTL (source: Juru)



2.5.3 Tower

A total of 5 types of towers are planned to be used, made of galvanized steel: 2 variations of H-guyed towers, 1 type of suspension towers and 2 angle or deviation towers. Terminal towers may also be used. Tower designs are illustrated in Figure 25 to Figure 28 and comprise three different types of towers:

- Suspension towers (intermediate towers) — used to support the conductors on straight line stretches (type R2+5).
- Angle or deviation towers — used at points where the route changes directions (types U1 or U2k).
- H-guyed towers - can be used in areas with limited space or in challenging locations, such as mountainous regions (types PB4 or PB5).
- Terminal towers — used at substation entry.

Self-supporting towers have four ground-level foundation columns used to support the steel structure. For the guyed towers, two tower legs spread apart from the tower bridge (upper section of the tower) down to the tower base, and there are at least four guy lines for tower stability. The exact tower type, height will be dependent on the terrain (minimum permissible ground clearance), the minimum required span length to maintain sag clearance, spacing between the conductors and ground wire requirements. The tower arms hold the insulators and the conductors. Conductors carry two or three-phase circuits and are built with two-conductor bundles to reduce the formation of corona discharge and the resultant audible and radio-frequency noise.

The height parameters for the towers are presented in Table 8 below:

Table 8: Tower height parameters

Tower type	Tower height (m)	Height to the wire (m)
PB4	32.2	27.2
R2+5	38.0	32.0
U2k	24.3	21.8

Figure 25: Self-supporting 500 kV R2+5 Steel Lattice Suspension Tower (single circuit) (source: Juru K-B FS)

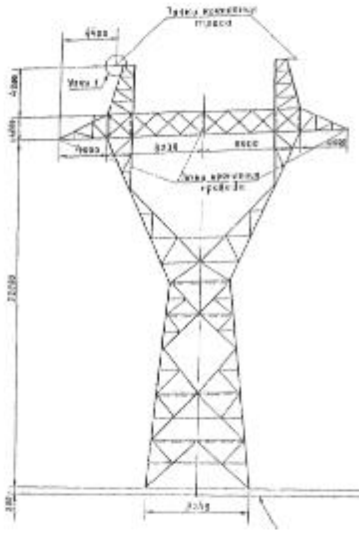


Figure 26: 500 kV H-Guyed PB4 suspension (intermediate) tower (single circuit) (source: Juru K-B FS

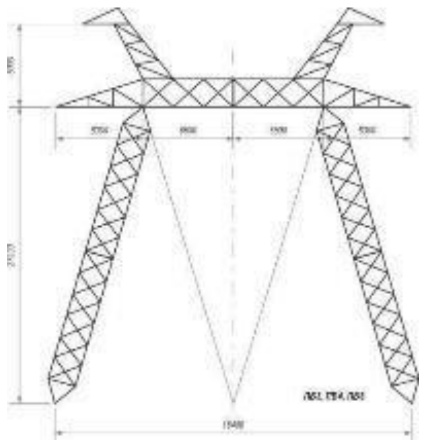


Figure 27: U2k 500 kV angle tower (single circuit) (source: Juru K-B FS)

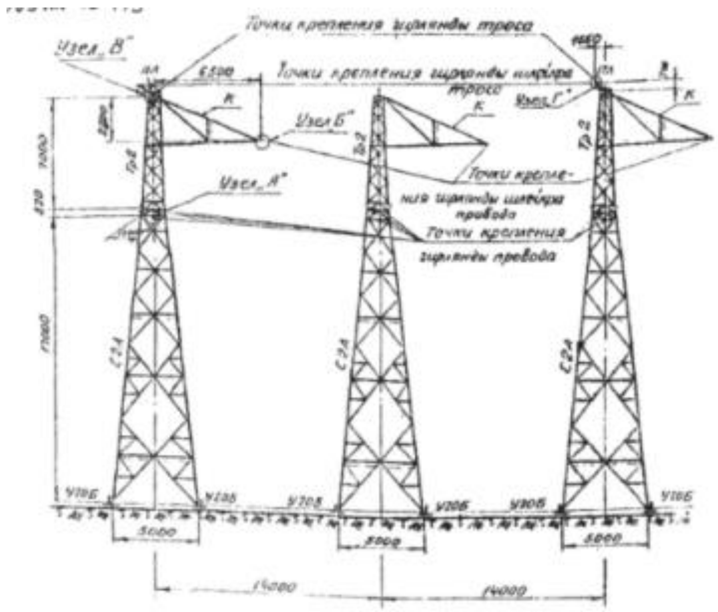


Figure 28: Self-supporting 500 kV Steel Lattice Suspension Tower (single circuit) (source: Juru)

2.5.4 Foundations and grounding

Tower footprint and foundation requirements are summarised in Table 9. At each tower location, the foundations are grounded to prevent risks from lighting strikes to workers or animals in the vicinity of the towers.

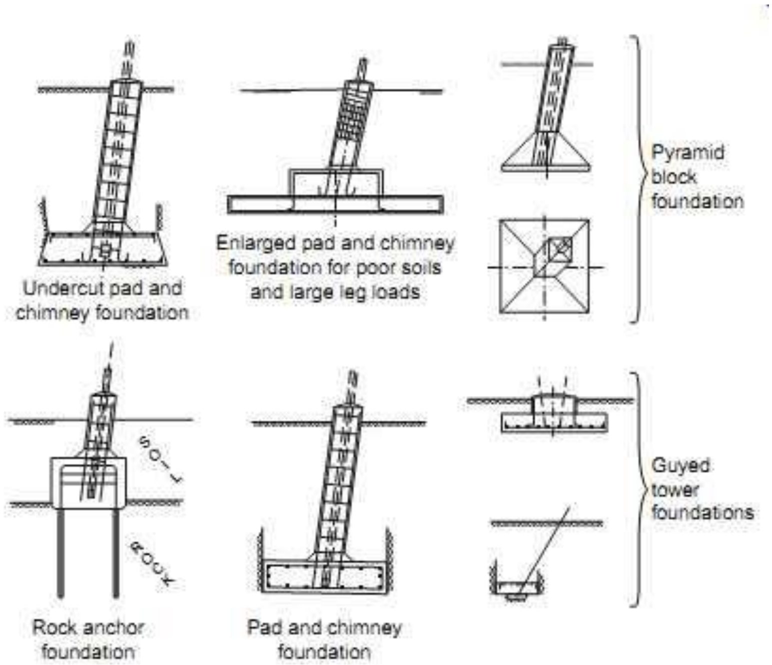
Table 9: Foundation characteristics (source: Juru and NEGK)

Tower Requirement	R2+5 500 kV (self-supporting)	PB 4 500kV (guyed)	U2k 500 kV (angle)
Number of foundations	Four foundation columns at ground level	Two foundation columns at ground level	Four foundation columns at ground level
Average footprint	9.048m x 6.272m (56.75 m^2) (the footprint is defined as the outer of the foundation columns at ground level).	18.4m x 19.2m (353.28 m^2) (total) (b) (the footprint is defined as the outer border of the guy wires).	7.5m x 5m (37.5 m^2) (the footprint is defined as the outer of the foundation columns at ground level).
Foundation type	Actual size and type will depend on the type of tower and the sub-soil conditions. The main types are “piled”, “pad and chimney”, and “anchors”. Angle towers will require more extensive foundations.		

Tower Requirement	R2+5 500 kV (self-supporting)	PB 4 500kV (guyed)	U2k 500 kV (angle)
Notes	Area inside the footprint can return to natural habitat, but not easily used for grazing.	The area inside the footprint can be used, although may restrict the movement of machinery – not preferred in agricultural areas due to guy wires.	Area inside the footprint can return to natural habitat, but not easily used for grazing.

Examples of different foundation requirements are presented in *Figure 29*. The foundation specification will be developed by the EPC contractor.

Figure 29: Typical OHL tower foundation (source: industrial electronics.com)



2.5.5 Conductors (wires)

An electrical conductor is a material that conducts or transmits electricity. Typically, conductors are made at a certain specification to conduct electric current at the prescribed voltage. The transmission line will use a conductor 3xAC300/51, which is part of the ACSR (Aluminium Conductor Steel Reinforced) type. Conductors are strung between towers to ensure a minimum electrical clearance height at the lowest point (the point equidistant between the two towers) considering parameters such as temperature, ice, wind load, and time. Typically, two or more conductors are used per phase, connected at intervals by spacers.

In addition to the conductor, the OHTL also has a shield wire (earth wire) that is strung above the phase conductors and is part of the line earthing system. The shield conductor protects the phase conductors (main wires) from lightning. The new line combines the shield wire with an Optical

Ground Wire OPGW[6] that strings across the top of the towers and provides the means for internal line protection, communication and control.

The conductor will enter the SS via a terminal tower down to a height of approximately 15m, linking up with landing gantries in the substation. The conductors will link to the existing substation system via parallel steel structures between transformers within the substation footprint.

2.5.6 Insulators

Insulators isolate the towers from the live wires that carry the electricity. They are typically made of glass, ceramic, or composite materials and are attached to the towers. In a suspension tower, the insulators are vertical or V-arrangement. In a dead-end tower, the insulators are in the horizontal position. Dead-end towers are typically located every 5 to 15 towers and are placed there to section the OHTL conductor to minimise whole line faults. Examples of different insulators typically used are provided in Figure 30 to Figure 32.

Clearance distances between the structure's live and non-live parts will be maintained per national standards. Where these clearances pose an electrocution risk to perching birds, bird guards will be installed to prevent injuries.

Figure 30: Vertical insulator (source: Juru)

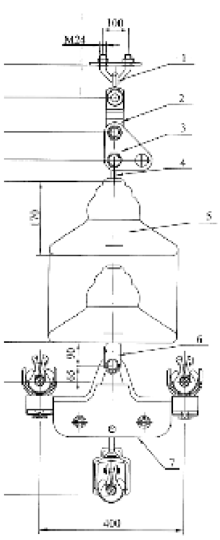


Figure 31: V-arrangement insulator (source: Juru)

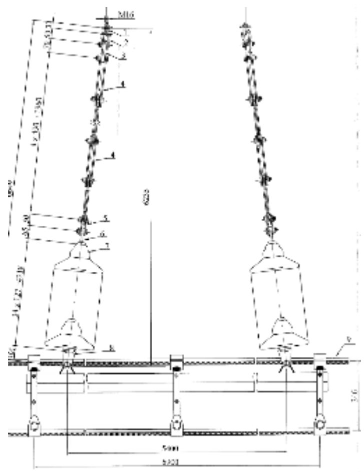
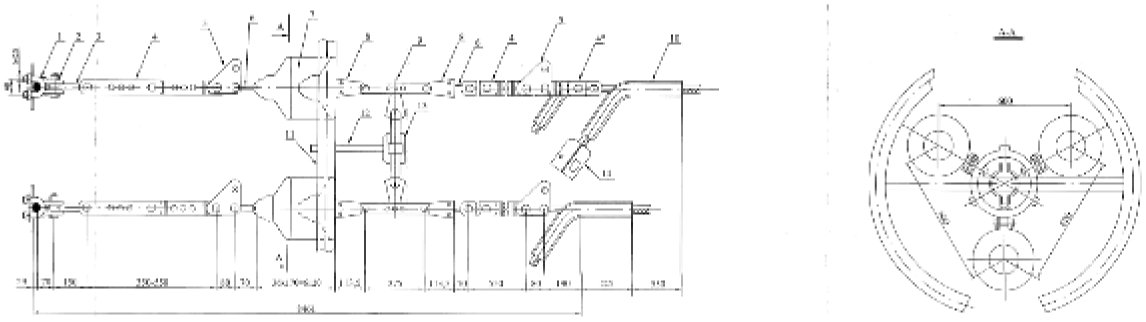


Figure 32: Horizontal insulator (dead-end tower) (source: Juru)

6 The OPGW combines the functions of grounding and communications. An OPGW cable contains a tubular structure with one or more optical fibers in it, surrounded by layers of steel and aluminum wire. The OPGW cable is run between the tops of high-voltage electricity pylons. The conductive part of the cable serves to bond adjacent towers to earth ground, and shields the high-voltage conductors from lightning strikes. The optical fibers within the cable can be used for high-speed transmission of data, either for the electrical utility's own purposes of protection and control of the transmission line, for the utility's own voice and data communication, or may be leased or sold to third parties to serve as a high-speed fiber interconnection between cities (https://en.wikipedia.org/wiki/Optical_ground_wire).



2.5.7 Kemin substation end-user works

The 220 kV/500 kV Kemin SS began commercial operation in 2017. A new substation bay will be installed within the substation footprint. The existing SS is enclosed by steel fencing and electric security around the perimeter, including office buildings and a car park. The compound is already level and surfaced with stone chippings.

For the specific end-user works, no significant site preparation works will be required (e.g., soil investigation and environmental surveys). To connect the new 500 kV, a new 220/550 kV step-up transformer will be installed. Transformers are the equipment used where different operating voltages must interface (e.g., the existing 220 kV system with the planned 500 kV OHTL). As well as transforming the voltage, they introduce impedance between the systems, controlling fault currents to safe levels. Construction activities include the following:

- Civil works consist of possible piling for new foundations, upgraded site drainage where necessary, foundation works, and bunds (where required).
- Plant installation involves delivering equipment to the site (including possible abnormal loads in transformers). Small cranes may be required to lift the plant into a position fixed to the foundations.
- Commissioning — electrical equipment and Supervisory Control and Data Acquisition (SCADA) instrumentation systems are installed by specialist contractors in the substation operations room, where they are then commissioned to ensure they function correctly. Commissioning involves the testing of control systems.

It is not envisaged that there will be any need to transport raw materials (aggregates) to or from the site. Cement for the foundations is likely to be sourced from a nearby batching plant with no mobile batching plant required. No upgrade or expansion works are required to the existing access road from the main road to the substation gate. There is expected to be sufficient space within the existing substation footprint to act as a laydown area for all equipment and materials required for the proposed works.

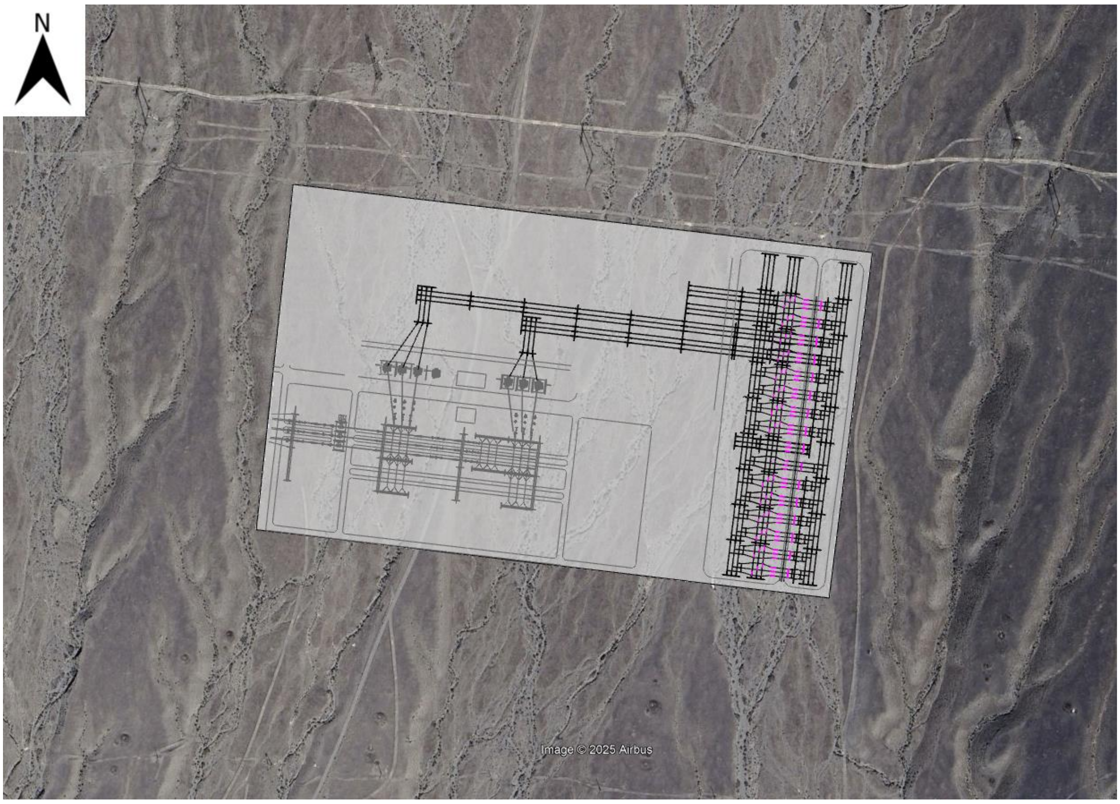
2.5.8 New Balykchy substation

The proposed Balykchy SS as shown in Figure 11 and Figure 34 is located 6 km west of Balykchy. The land cover is mainly arid or semi-arid desert (Figure 33). Key requirements for the development works include:

- Operational area of approximately 492m x 290m
- New access from EM11 highway of approximately one kilometre
- Land acquisition
- Site preparation and levelling
- Substation construction works (including transformers and switchgear)
- Delivery of abnormal loads such as transformers
- Connection for the new 500kV OHTL.

Figure 33: Balykchy SS Site

Figure 34: Proposed Balykchy SS layout[7]



The main component of the new Balykchy SS are summarised in Table 10.

Table 10: Main components of Balykchy SS

No.	Equipment	Description and Key Specifications
1	Autotransformers	500/220/35 kV, 167 MVA, 7 pcs (1 reserve), oil-immersed, OLTC, forced oil circulation, air cooling
2	Shunt Reactors	500 kV, 120 MVAr, 3 pcs, oil-filled, air cooling
3	Circuit Breakers and Disconnectors	500 and 220 kV, various types, including with one or two earthing blades
4	Instrument Transformers	Current and voltage transformers (CTs and VTs) with support structures for 500 and 220 kV
5	Relay Protection and Automation (RPA)	Main and backup protection cabinets for transformers and lines (500/220 kV), breaker control cabinets, bus differential protection, central alarm cabinet
6	Automated Metering System (AMI)	Includes three-phase meters, data acquisition and transmission devices, power 7supply, and communication in8terface

7 The corner points of the approved substation area are marked with green pins; the blue polygon represents one of the previous versions; the yellow polygon indicates the original area considered for potential substation options; the red polygons represent hazardous ravines; and the red circles mark a 50-meter buffer zone around archaeological sites.

No.	Equipment	Description and Key Specifications
7	Telemetry System	Measuring transducers, switching and power supply equipment
8	Communication System	High-frequency and optical communication cabinets, fixed/vehicle radio stations, antennas
9	Insulator Strings and Bus Conductors	Sets of suspension and tension insulator strings, 500/220 kV bus conductors
10	Supporting Structures and Surge Protection	Support insulators, bay/busbar gantries, surge arresters

2.5.9 Access road

Gravel tracks and the existing main road (EM11) will act as the main access route to the OHTL ROW. Gravel access roads were established during the construction of the existing adjacent 500 kV and 220 kV lines and these would be used for transportation of crews and materials to access the proposed route ROW. From 50 up to 70 km of new unpaved access road may be required (Figure 35). Temporary tracks to each tower work front within the ROW will be established avoiding key biodiversity features as defined in the mitigation section of section 7.10 and community safety requirements (e.g. to avoid village of DEU-10) as outlined in section 7.9.

Figure 35: Examples of existing gravel access road conditions near Balykchy SS

2.6 Stages of the project cycle

The project cycle has four main stages: pre-construction, construction, operation and decommissioning[8]. Typical activities performed during each stage are listed in *Figure 36* and described below.

Before construction works commence, final decisions as to structure types, foundation requirements, conductor size and type, insulation, and line hardware, bird protection devices will be determined following the feasibility study requirements (to be completed) and the outputs of the ESIA.

The ROW and access routes will be surveyed, and the towers' OHTL centre line and locations will be marked (hereafter referred to as the tower work front). Based on the type of vegetation along the route, limited, if any, vegetation clearance is expected. Any required vegetation clearance will only be performed at the tower foundation locations, stringing positions and along access roads to the foundation sites from existing roads following the biodiversity mitigation requirements determined by the ESIA.

Construction of the OHTL itself typically progresses sequentially by one or more teams (of approximately eight to fifteen workers) working along the whole OHTL or simultaneously on multiple sections of the OHTL route. The key activities required at each work front are site clearance (rocks, vegetation), enabling works to establish vehicle access to each tower location, civil works (tower foundation works), steel delivery, steel erection, assembly and installation of the insulator, pilot wire installation, conductor stringing and then commissioning. Pre-mixed concrete will be delivered to the site in wagons along with steelwork for the foundation frames and bases, as illustrated in Figure 37 and Figure 38. Alternatively, pre-cast foundation blocks will be used which will be manufactured outside the local area and delivered to the worksite.

8 Ultimate Guide to Electric Power Engineering: Transmission System: http://www.industrial-electronics.com/elec_pwr_3e_0.html

Figure 36: Stages in the project cycle

Pre-construction	Construction - civil works	Construction - mechanical and electrical works	Operation	Decommissioning
• Finalize design / Establishing the ROW / livelihood restoration • Storing of materials • Recruitment of local workforce / services • Identification of local materials / Site set up • Establish accommodation facility • Procurement (establishing the supply chain)	• Secure worksites • Construct access road (as needed) • Transportation of civil construction materials to site • Vegetation clearance and levelling • Excavations works at tower bases • Foundation works (including delivery of cement) • Transportation of steel work to site • Substation civil works	• Tower erection • Conductor stringing • Connect conductor cable • Electrical assembly at SS • Commissioning of OHTL and SS • Reinstatement of temporary work areas disturbed during civil works	• Operation of OHTL • OHTL/SS preventative maintenance • Periodic / planned maintenance • Monitoring and maintaining the OHL	• Removal of construction materials • Rehabilitation of temporary storage and accommodation areas • Installation of security and safety requirements • Reinstatement of excavated areas

Figure 37: Example of tower foundation construction (source: NJDA, 2022)

Figure 38: Example of tower foundation construction (source: NJDA, 2022)

Figure 39: Example of tower assembly process (source: NJDA 2022)

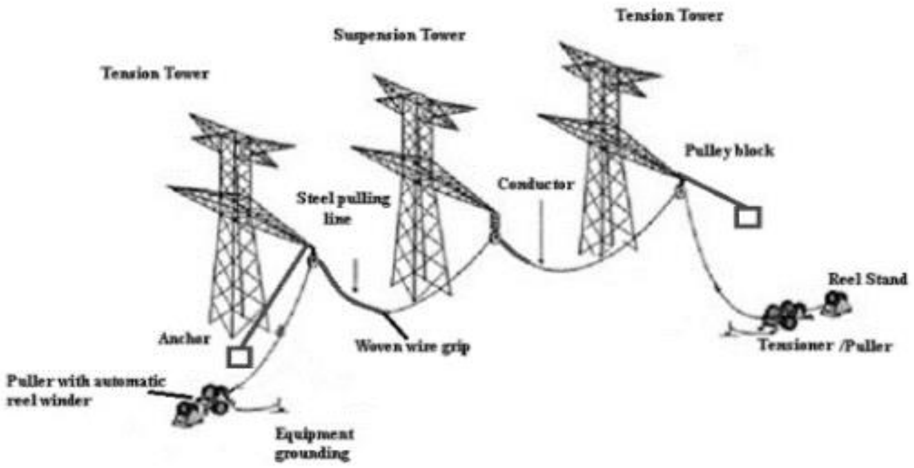
Figure 40: Example of tower assembly process (source: http://cscon.co.za/ and EDM)

The tower is typically erected using a mobile crane, which lifts the assembled steelwork into position, see Figure 39 and Figure 40.

Stringing the OHTL is typically performed by one of four methods: slack stringing, semi-tension stringing, full tension stringing or helicopter stringing. The first two methods involve laying the conductor on the ground between the towers and lifting it into place. These methods do not keep the conductor off the ground between the towers. Full tension stringing is typically performed by using a guy wire/pilot wire that is used to “pull” the conductor from the “conductor reel” at the start of the stringing point to another “pilot line winder reel” where the guide/pilot wire is collected. Pull sections incorporate, on average, about four towers. However, it is possible to tailor the length of the pulling section to consider technical requirements for any human receptors that may be disturbed by the works or ecological sensitivities. Sufficient pulling capabilities on one end and tension capabilities on the other keep the wires clear of any obstacles on the ground during the conductor's movement from the reel to its final sag position[9]. This approach is envisaged as the preferred option for this Project as it minimises the potential for damage to the conductor, minimises impacts on the ground, and removes the need to overcome obstacles such as pulling over roads, sensitive habitat types, etc. A example of the stringing technique can also be viewed at https://youtu.be/qOzpWk_ZKIg?si=P-CB2q4Gcq4TOw30. Helicopter stringing is not envisaged as necessary for this Project.

9 https://electrical-engineering-portal.com/guidelines-for-the-construction-and-maintenance-of-transmission-lines

Figure 41: Stringing the conductor (source: Electrical World Magazine, 2021)



The main works associated with the operation of the OHTL are maintenance of the ROW, tower and line inspections (including visual inspections) and tower and conductor preventative maintenance work. Routine vegetation management and clearance along the ROW during operation is unlikely, given the slow-growing nature of the vegetation in the ROW. Preventative maintenance works are typically scheduled when the line can be taken out of operation (de-energised) to minimise health and safety risks from working on live equipment; however, maintenance work on live equipment cannot be ruled out and will be performed by highly specialised workers. There may also be a need for emergency works following an electrical fault or hardware failure resulting from missing bolts, lightning strikes, bird strikes etc.

PJSC NEGK will organise and implement preventative and emergency maintenance works following their corporate maintenance schedules, PJSC NEGK maintenance guidelines and procedures, and training requirements.

The SS's will either be remotely operated or have one or two permanent workers (operating a shift system). The SS's maintenance works will be intermittent and within the operational site boundary.

Decommissioning or closure falls into one of two categories:

- end of life decommissioning (approximately 50 years); and
- temporary work-site decommissioning (e.g., borrow pits, laydown areas, accommodation sites).

Both decommissioning activities will be required to remove all above and below ground structures and reinstate land to its original state. Typically, the conductors are removed section by section and immediately rewound using pulling and braking machines. The pylons are dismantled, and the foundations are removed from the ground and taken away by a lorry as soon as the project is finished, the temporary access roads are rehabilitated, and the land is restored to its original state. All waste from the site is collected and taken to a suitable water disposal facility aligned with GIP. A final survey of the area around the site is then carried out.

2.7 Other activities

2.7.1 Establishing the ROW

The land acquisition requirements for the ROW acquisition process will be fully discharged before mobilising any construction works within the ROW. It is expected that all works connected with the OHTL construction and operation will take place within the ROW. This will be further described in the Volume V: Land Acquisition and Resettlement Framework (LARF).

2.7.2 Construction laydown area

Currently, the location of the construction laydown area has not been established. Temporary construction laydown areas will likely be set up at the existing Kemin and proposed Balykchy SS to act as the primary storage site for general equipment and material laydown for use along the OHTL ROW. One of these locations will include site offices, equipment and material storage, hazardous substances storage area, waste storage area, medical facilities, catering and welfare provisions.

The construction laydown area would connect to the existing substation power supply (Kemin SS, existing Issyk-Kulskaya SS) or be powered by onsite diesel generators during the construction/decommissioning phases (new Balykchy SS). No power requirements are required during operation.

Short-term mobile laydown areas may also be established at strategic locations along the OHTL route for overnight storage of key plant, equipment and materials, and necessary welfare facilities, e.g. mobile toilets and rest shelters. These may move along the OHTL following the construction works.

2.7.1 Worker accommodation

All skilled labour from outside the province or country is expected to be accommodated in existing suitable accommodation in the region (refer to section 4.5.23 for further description of local accommodation availably in the region). Final worker accommodation options will be confirmed in collaboration with local stakeholders and following inspection for alignment with the standards set out in the IFC/EBRD Workers' Accommodation: process and standards (August 2009). Smaller camps along the OHTL route are not expected as the overall length, and the quality of roads in the area mean that travel from the main cities to the work front and back in one day is realistic. Local workers will reside at home and be transported daily from nearby towns to the work front. The total number of workers from outside the region who will require accommodation is expected to be between 50 and 100 persons. These requirements and the solutions will be implemented in accordance with the Project Accommodation Management Plan

2.7.2 Water Supply

Potable water for drinking and other welfare activities during the construction phase will be sourced from the municipal water supply system in Balykchy and/or Kemin and delivered to the construction camp and the OHTL work front by a tanker or bottled water. At least 4.5 litres per person daily will be available at each OHTL work front, particularly during hot weather. Plastic bottles will be removed from the site and recycled via third party contractors in line with the project waste management plan. A minimum of 48 hours of storage is also expected at the laydown area.

Water requirements for construction are mainly limited to the tower foundation cement manufacturing process. Cement will be produced at an existing cement batching plant in the local area, or prefabricated concrete blocks delivered from outside the area will be used. Licences for abstraction of water for the cement manufacturing process will be the responsibility of relevant third parties which the Project will vet during the procurement and contracting process and this requirement will be outlined in the Project management plans.

2.7.3 Equipment and material supply chain

Key components of the OHTL and substations such as the steel towers, conductors, insulators and other electrical equipment (e.g., transformer / SCADA equipment) will be procured by the Main Contractor (tier 1 supplier) using sub-contractors and suppliers (tier 2 suppliers) in their supply chain and sourced from outside the Project area. All tier 1 and tier 2 suppliers will be subject to approval by PJSC NEGK.

Tier 2 suppliers and contractors are likely to include:

- key equipment suppliers (where they are not supplied directly by the main contractor);
- electrical commissioning contractor (for substation and OHTL commissioning works) (where it is not performed directly by the main contractor);
- local transportation contractor;
- civil contractor (local/regional) including cement manufacture.

Tier 1 and tier 2 suppliers as defined above are considered primary suppliers as per EBRD PR1 and are subject to the supply chain requirements of the Project.

There are also likely to be several tier 3 suppliers providing the catering, accommodation, geotechnical, environmental, security, driving, and waste management services. These suppliers will be sourced from the local area or region.

All Tier 1 and Tier 2 suppliers will meet the Project E&S standards applied to the Main Contractor via back-to-back contractual obligations enforced through the Project management plans and Lender Environmental and Social Action Plan (ESAP).

All Tier 1 and Tier 2 suppliers will be required to demonstrate credentials relating to the prohibition of forced and child labour in their supply chain and health and safety standards that align with GIP and robust labour management policies (further specific requirements are defined in subsequent sections).

Materials and key equipment are expected to be delivered to the nearest railway station (Rybachie) and then delivered to one of the construction laydown areas at either end of the OHTL. Onward transport of equipment to the work fronts will be via small and medium-sized vehicles on an as-needed basis to minimise the opportunity for theft or damage. Potential abnormal load deliveries may be required for new transformers delivered to the Kemin SS and/or Balykchy SS.

2.7.4 Workforce

Typical workforce requirements for a project of this type are summarised in Table 11

Table 11: Typical workforce requirements

Development stage	**Estimated workforce requirements**			**Other**	**Worker category**
Owner management (PIU)	3				NEGK
Owners Engineer (site based)	6				NEGK
E&S personnel / CLO	3				NEGK
Construction phase	**EPC**	**Civil works**	**Electrical works**		
Management	4	4	4	-	Subcontractor
Skilled labourer's (outside region)	10	30	30	-	Subcontractor
Local/Regional skilled workers		15	15	-	Subcontractor
Local unskilled workers		20	5	-	Subcontractor
Drivers (regional)	0	5	5	-	Subcontractor
Security	-	-		6	Subcontractor
EHS personnel	2	2	1	5	
Sub-total construction	28	75	60	11	
Total Construction	**174**				
Operation					
Owner management	1	-			NEGK
Owner engineer	2	-			Contractor
EHS personnel (ornithologists) (part time)	2	-			Contractor
Operations and maintenance workers (skilled)	4 to 10 for rare events and maintenance works			-	NEGK
Security (working in shifts)	3 shifts of 2	-			Contractor
Total operation	**22**				

Overall, the construction labour workforce requirements are unlikely to exceed 200 workers over the duration of the construction phase. The peak period for construction works will be during the civil works period, predicted to last approximately nine months. The tower erection and electrical assembly at the substation sites are predicted to last approximately six months, overlapping with the end of the civil works. Approximately 70 skilled workers from outside the region may be required during the construction phase. The remaining skilled and unskilled workers required for the civil works are likely to be sourced regionally or locally. There may be limited opportunity for local employment in the unskilled labour positions and to support the workers accommodation facility and opportunities to enhance this will be employed where possible.

During operation, no permanent workforce is assigned to the OHTL. Existing employees of PJSK NEGK will be responsible for operation and maintenance (O&M) works and for implementing any operational phase health, safety, environmental and social obligations. NEGK may be supported by an outside E&S consultant for this purpose.

2.7.5 Development schedule

The anticipated development schedule is set out in Table 1 and is expected to last approximately 18 months, with the majority of the below-ground construction works finalized by monthly nine and above ground works taking nine months. Work at any one work front is expected to be short (approximately two weeks for civil works and separately another week for the conductor stringing).

2.8 Associated facilities

Associated activities are defined as those projects that are not funded as part of the project, and whose viability and existence depend exclusively on the project and whose goods and services are essential for the successful operation of the project: Associated facilities are identified in Table 12. Both projects are being internationally funded and are understood will be developed in accordance with international Lender standards.

Table 12: Associated facilities

Associated Activity	Expected Construction Start Date	Expected Commissioning Date	Comments
Solar PV project near Kemin Substation	2024	2026	Construction commenced
Solar PV project (6 km to the West of Balykchy)	2024	2026	Construction commenced
KyrgyzWind wind project	TBC	TBC	Preliminary studies are underway

2.9 Neighbouring facilities and future planned projects

The ESIA has identified several construction sites and other energy and water sector projects under development near the OHTL ROW as listed below. These are evaluated in the cumulative impact assessment in the sections below.

- Solar photovoltaic (PV) power plant - currently under construction and located 6 km to the West of Balykchy
- Solar PV power plant - The land plot designated for the SPV is located approximately 1 km southwest of the Kemin substation (construction has not yet started)
- New wind power plant being operated by KyrgyzWind - 15 kilometres to the South-West from the existing Issuk-Kul SS and proposed OHTL.[10]
- King Kliner factory - 300 meters from the OHTL route in the area of the Kemin substation (Figure 42 is a company specializing in the production of building facade materials. The facility has a well-secured perimeter with a high fence.
- Concrete plant - one kilometre east of the Kemin substation.
- Concrete plant – one kilometre east of the planned Balykchy substation (Figure 43)
- Brick manufacturing facility - twenty kilometres west of Balykchy and 600 meters from the planned OHTL route.

10 https://invest.gov.kg/investmap/map.xhtml?lang=ru#

Figure 42: Construction material factory

Figure 43: Storage of materials of cement factory

2.10 Analysis of Alternatives

2.10.1 No project alternative ("do-nothing option")

Not constructing the K-B OHTL will avoid any potential E&S impacts connected with the construction, operation and decommissioning of the OHTL. However, the "do-nothing" option could hinder the upgrade of the national transmission system, which is required to improve grid security and support the transition to a lower-carbon economy. The installation will also support improvements in the transmission losses experienced when transmitting energy over long distances. Positive socio-economic impacts related to direct employment of personnel on the

OHTL construction work, and wider employment connected to the expansion of RE projects in the region may also be lost in this case.

2.10.2 Alternative concepts

There is no alternative strategic option available for the wider grid strengthening to achieve the same objectives as the K-B OHTL.

2.10.3 Route and Substation alternatives

The first step in the route options appraisal was to define a OHTL corridor from the existing Kemin SS to Balykchy. Feasibility study considered three alternative OHTL routes and three location options for the Balykchy 500 kV substation as presented in Figure 44 below.

- Option 1 - Approximately 48 km 500kV OHTL between the settlements of Kemin (Chui region) and Balykchy (Issuk-Kul Region) routing through the Boom Gorge
- Option 2 – Approximate 54 km 500kV OHTL between the settlements of Kemin (Chui region) and Balykchy (Issuk-Kul Region). From the Kemin SS the route heads west into the mountains broadly routing adjacent to an unpaved gravel road and existing 500kV OHTL ("Datka-Kemin") before heading back to the Kok-Moynok-2 where the route crosses the Bailamtal River and the follows a similar alignment as to "Bishkek-Torugart" highway (and route option 1) for approximately 18 km towards Issyk-Kulskaya existing substation (or the new Balykchy substation approximately 6 km outside Balykchy)
- Option 3 – Approximately 50 km of 500 kV OHTL between the Kemin substation and the new Balykchy substation. From the Kemin substation, the route follows towards the Boom Gorge, but upon entering, it ascends the slopes of the gorge and runs along the ridges of its eastern side. After the Gorge runs in parallel to other options.

A summary of the advantages and disadvantages of each route option are provided in Table 13 below.

Two substation alternatives were considered.

- Substation Option 1 – new Balykchy SS next to existing Issyk-Kulskaya SS in Balyckhy city
- Substation Option 2 – new Substation approximately 6km outside Balykchy as shown in Figure 44.

A summary of the advantages and disadvantages of each substation option are provided in Table 14 below.

Figure 44: Project alternatives

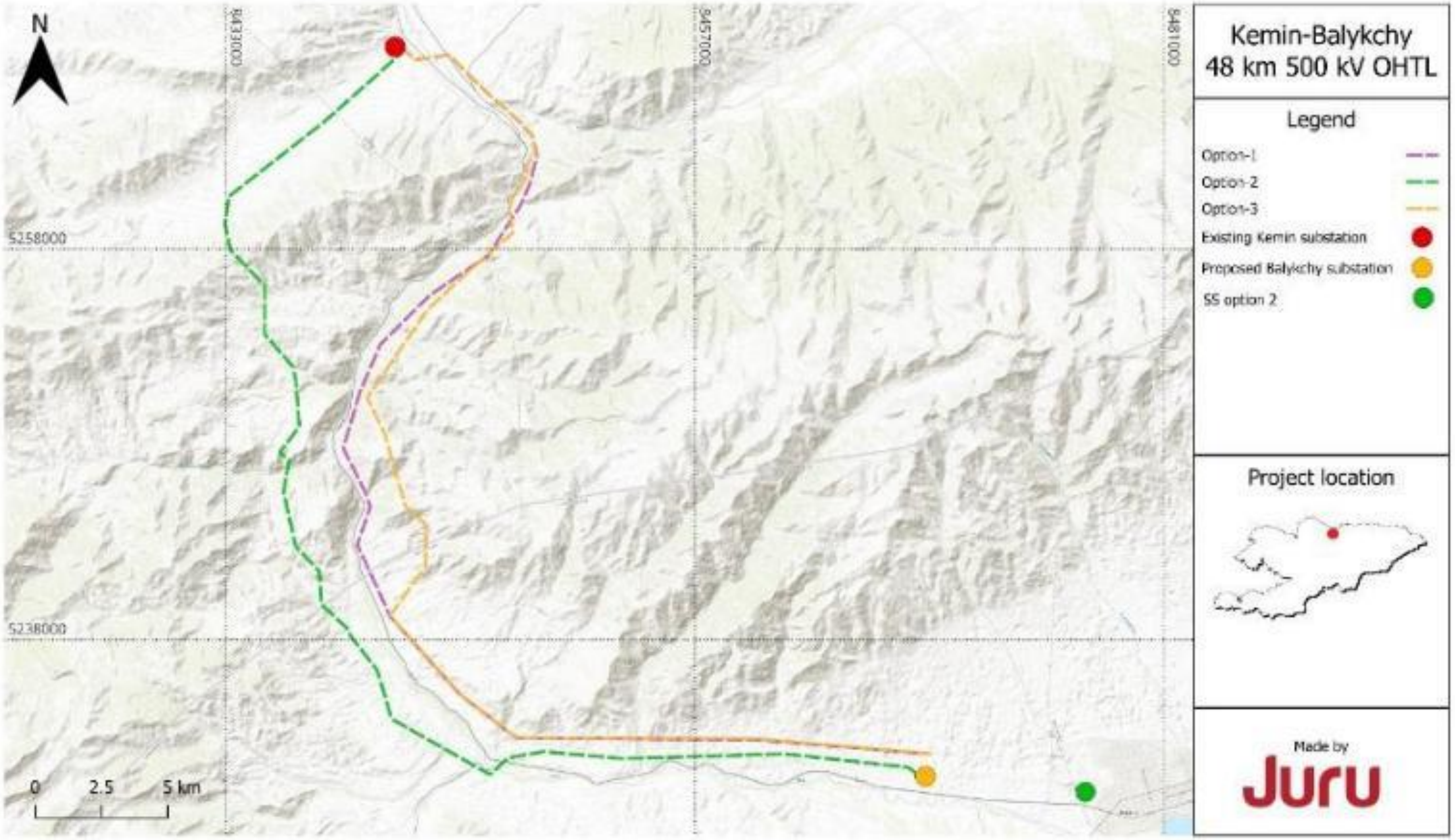


Table 13: Qualitative comparison of the connection route options

Option	Safety	Rank	Land use / Involuntary resettlement impacts	Rank	Biodiversity	Rank	Total
Option 1	The route necessitates several infrastructure crossings and has access challenges when routing along the right bank of the Chu River. Access to the potential tower sites in the narrow gorge present safety and constructability issues.	2	There is an intersection with the land plot of a cement plant (C2) near the Kemin substation. The route does not intersect with villages, but it does intersect with small clusters of farms (F3, F7, F8, F9, F10) and rural households (S2, S4, S6, S7).	1	Minimal impact on biodiversity is expected as this route follows existing infrastructure and mostly crosses modified habitat. However, care is needed to minimize the impact on the biodiversity of the riverine forest.	2	5
Option 2	Route follows existing OHTL for key portion of the route. Access to the ROW can be via existing gravel roads used for the adjacent lines.	1	There are no villages or commercial facilities along the mountain portion of the OHTL. The main receptors are small clusters of farms (F4, F6, F13, F15) and rural households (S1, S3, S6, S7).	1	As the route follows the existing OHTLs, the impact on habitat will be minimized through the use of the existing access roads. Limited potential impact on sensitive bird, fish and plant species can be mitigated.	1	3
Option 3	The route does not intersect with infrastructure, but the laying of the OHTL along the ridges of the Boom Gorge presents access challenges. Access to the potential tower sites in the narrow gorge also presents safety and constructability issues.	3	There is an intersection with the land plot of an existing cement plant (C2) near the Kemin substation. The route does not intersect with villages, but it does intersect with small clusters of farms (F3, F7) and rural households (S4, S6, S7).	1	This route option crosses natural habitats and new access roads will be needed along the mountainous area of the northern section of the route, home to snow leopard and its prey species.	3	7

Table 14: Qualitative comparison of the project substation options

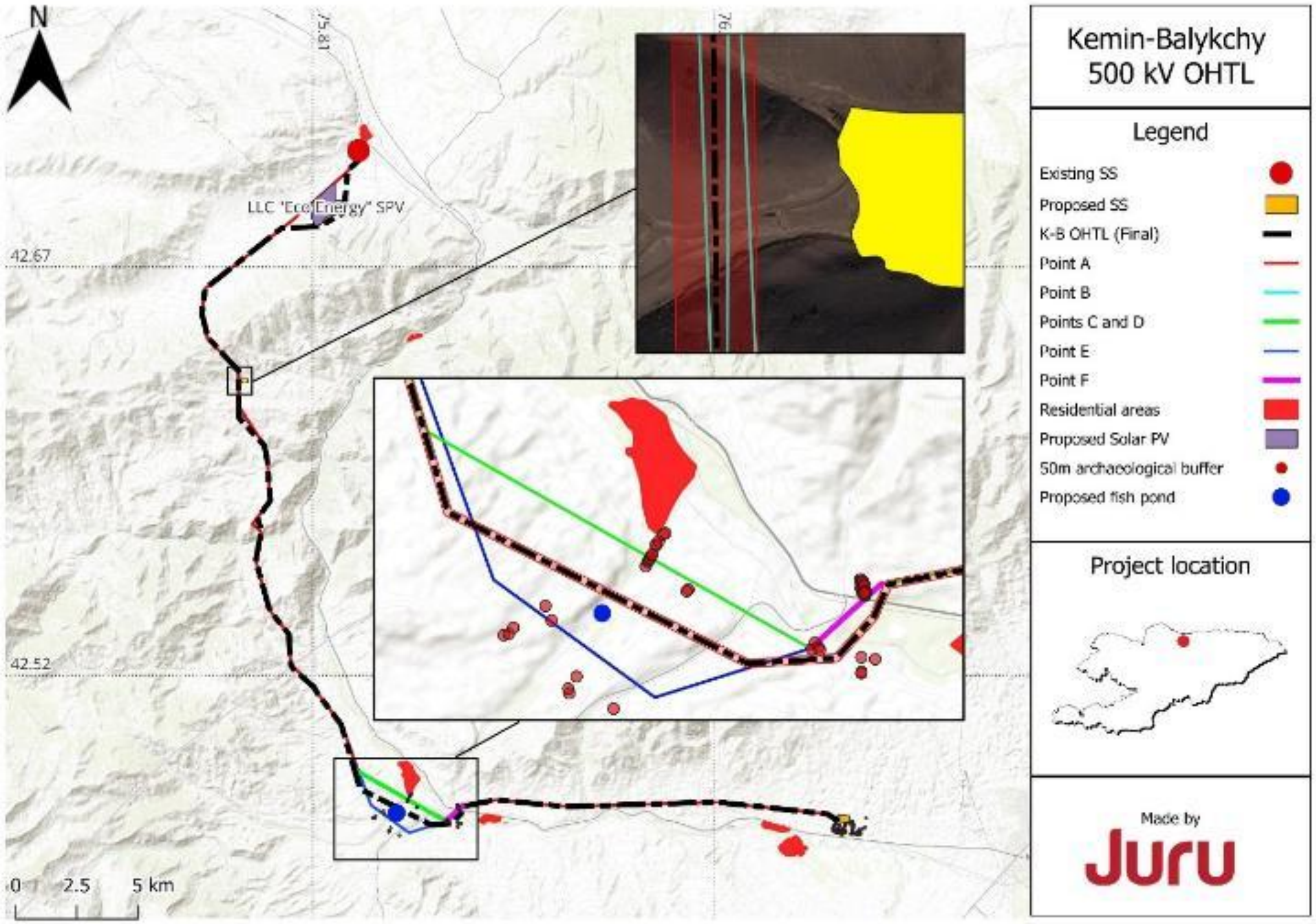
Option	Safety	Rank	Land use / Involuntary resettlement impacts	Rank	Biodiversity	Rank	Total
Option 1	The site is easily accessible from the EM11 highway and other roads from the direction of Balykchy, making it convenient for the transport of equipment and materials.	1	The exact area of the substation has not been determined due to the decision to proceed with Option 2. The total area considered for the potential substation could lead to partial land acquisition from garden plots. Residential houses could be located within a 100-meter buffer from the substation.	1	Completely anthropogenically transformed urban area.	1	3
Option 2	The site is easily accessible via the nearby EM11 highway, making it convenient for the transport of equipment and materials.	1	There are no residential structures or agricultural plots on the substation site. It may be used as pasture only for a short period due to the aridity of the area.	2	Arid or semi-arid, with sparse vegetation consisting of small shrubs and dry grasses	2	5

2.10.1 Micro-routing alternatives

Following the selection of Route option 2 as the preferred route option, a number of micro route alternatives have been applied to minimise E&S impacts. Figure 45 shows the different micro route deviations and alternatives considered. The considerations at each of these points is described below.

- Point A – routing variation to provide the best routing to bypass the existing PV site.
- Point B – the route in this location was pushed as far west as possible (while still maintaining clearance distances between the existing lines and the planned lines) in order to provide a wide a setback as possible with the NABU wildlife centre.
- Point C- the route was changed to provide a setback from outskirts of the Kok-Moynok-2 settlement.
- Point D – a variation was considered to avoid routing over an existing fish farm south of the Kok-Moynok-2.
- Point E – a minor variation was considered to avoid routing over archaeological objects south of the Kok-Moynok-2 settlement.
- Point F - the route was changed when crossing the Chu River east of the village of Kok-Moynok-2 to avoid archaeological sites.

Figure 45: Micro-routing adjustments

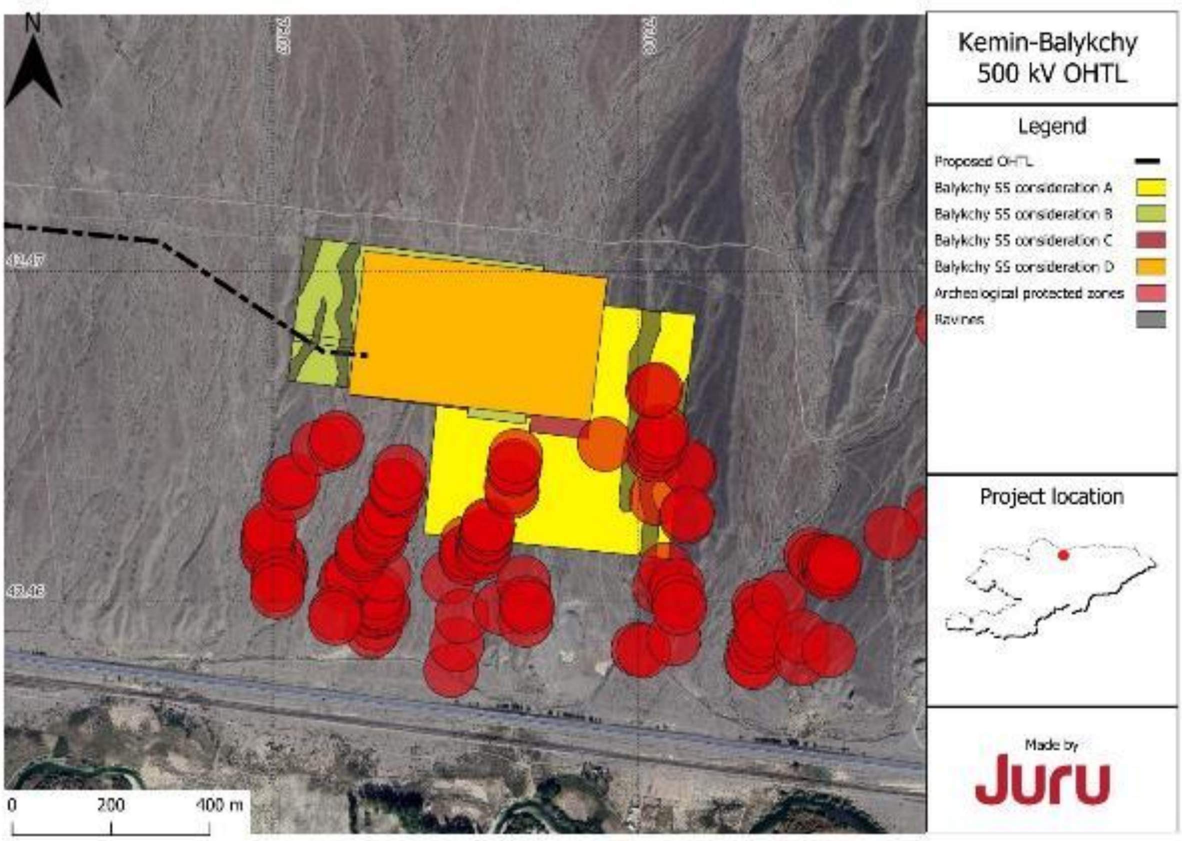


2.10.2 Micro substation alternatives

The final location for the new SS is the result of a number of micro-siting alternatives. These are illustrated in Figure 46 and described below.

- Point 1- Substation was sited to avoid planned PV site and existing access roads (Consideration A).
- Point 2 - Substation was moved to avoid cultural heritage sites near the Site[11] (Consideration B).
- Point 3 – Substation was moved to avoid ravines around the Site, as these ravines posed technical risks during operation (Consideration C).
- Point 4 – Substation was moved again to avoid cultural heritage sites near the Site. (Consideration D).

Figure 46: Micro-adjustments for Balykchy SS



11 Further explanation on the cultural heritage sites is provided the baseline and impact assessment chapters.

2.10.3 Technology alternatives

The Project will be required to select the specific design of 500KV OHTL towers, insulators, conductors and substation equipment. The exact specification is not determined at this time and will ultimately be defined by the EPC contractor. Different options for these project components are outlined in the Project description based on typical technology applied in Kyrgyz Republic. Any design preferences from the ESIA assessment, as detailed in Chapter 6, are noted in the relevant mitigation section and reflected in the Project ESMP (Volume IV) for inclusion in the EPC technical specification.

3 Policy, Legislative and Institutional Framework

3.1 Main entities

The main entities in the power sector that are relevant to the development of the Project are:

- Ministry of Energy of the Kyrgyz Republic - responsible for developing and implementing policy in the electricity sector.
- “Electric Power Stations” PJSC – responsible for electricity generation on large HPPs.
- “National Electric Grid of Kyrgyzstan” (NEGK) PJSC– responsible for the central transmission system operator (TSO) and distribution company, managing from high to low voltage power transmission and distribution and ensuring grid stability.
- Thermal Power Plants recently been transferred to local authorities – responsible for electricity generation.
- “Chakan GES” PJSC – responsible for electricity generation at small HPPs.
- Private power sector companies – responsible for electricity generation (mainly small HPPs) and distribution in the selected areas.
- Energy Supervision Service under the Ministry of Energy of the Kyrgyz Republic -performs state control and oversight functions to ensure compliance with energy sector legislation, including conducting acceptance tests for newly commissioned, reconstructed, and modernized electrical installations.
- Green Energy Fund under the Cabinet of Ministers of the Kyrgyz Republic - responsible for the design, maintenance, subsidizing, repair, reconstruction, construction, and development of renewable energy sources (RES).

Further information on the stakeholders listed above and other stakeholders relevant to the ESIA phase are mapped in the Project Stakeholder Engagement Plan (SEP) that accompanies this scoping report.

3.2 Kyrgyz Republic environmental regulatory context

3.2.1 Relevant government ministries

Activities associated with adverse environmental and social impacts are regulated by a specially authorized environmental protection body, represented by the **Ministry of Natural Resources, Ecology, and Technical Supervision (MNRETS)**, which oversees:

- The Department of State Environmental Expertise (EE) (conducting state environmental reviews of project documentation).
- The Environmental Monitoring Department (conducting laboratory research on environmental conditions).
- Environmental and Technical Supervision Services (state environmental control and monitoring of compliance with the norms and requirements of the legislation of the Kyrgyz Republic).
- Regional Departments of MNRETS (conducting state environmental reviews of project

documentation, regulatory and technical documentation, including environmental passports for enterprises, projects of maximum permissible air emissions, wastewater discharges, waste generation, and issuing permits for emissions, discharges, and waste disposal into the environment).

Other relevant stakeholders include:

- **The Ministry of Energy of the Kyrgyz Republic**: the state executive authority responsible for developing and implementing state policies in the fuel and energy sector, as well as exercising state control and monitoring compliance with energy legislation.
- **The Ministry of Emergency Situations of the Kyrgyz Republic:** the state executive authority responsible for developing and implementing state policies and regulatory framework, as well as supervision and control in civil defence, protection of the population and territories from natural and man-made emergencies, fire safety, and ensuring the safety of people on water bodies.
- **The Ministry of Health of the Kyrgyz Republic:** the central executive authority conducting state policy and managing health protection and medical insurance for citizens in the Kyrgyz Republic. It also serves as the National Coordinator for the International Health Regulations of the World Health Organization.
- **The Ministry of Water Resources, Agriculture, and Processing Industry of the Kyrgyz Republic:** the authorized state executive body responsible for state policies in water resources, including water funds, drinking water supply, land reclamation, irrigation, and meliorative infrastructure; the agro-industrial complex, including livestock, veterinary services, aquaculture, crop production, plant quarantine; agricultural lands (state agricultural land fund and pastures); food and processing industries (excluding unified state policies for production, import, storage, and circulation of ethyl alcohol and alcohol-containing products). It ensures uniformity in the application and enforcement of land and water legislation and oversees veterinary and phytosanitary safety, as well as green and organic farming, climate change adaptation, and mitigation measures in agriculture.
- **The Ministry of Health of the Kyrgyz Republic**, represented by the Department of Disease Prevention and State Sanitary-Epidemiological Supervision: the authorized body for control and supervision of facilities, regardless of ownership and departmental affiliation, ensuring compliance with technical regulations and other legal norms in public health. It identifies and forecasts potential impacts of biological, chemical, radiation, and other physical factors on the health of the population and workers and takes measures following the legislation of the Kyrgyz Republic.

3.3 Green Energy Policy

3.3.1 Kyrgyzstan's Green Economy Strategy

The Kyrgyz Republic ratified the Paris Agreement on 17 November 2019[12]. Under the Agreement, the Kyrgyz Republic committed to the following obligations:

- Develop national plans for emission reductions, technological upgrades, and adaptation to climate change.
- Systematically reduce CO_2 emissions into the atmosphere.
- Establish international exchanges of "green" technologies in energy efficiency, industry, construction, agriculture, and other sectors.

For a long time, the development of the Kyrgyz Republic, like most countries, was focused on achieving economic growth, primarily through the intensive use of natural resources. In recent years, it has become evident that continuing along a path of economic growth without properly considering environmental and social factors poses risks to current and future generations.

The concept of a "green" economy does not replace sustainable development but serves as a foundation for achieving it. Sustainable development, the key long-term goal, requires transitioning to a green economy. The United Nations Environment Programme (UNEP) defines a green economy as one that enhances human well-being, ensures social justice, and significantly reduces environmental risks and degradation.

In the Kyrgyz Republic, a green economy is understood to increase human well-being and strengthen social justice while significantly reducing environmental risks, preserving and enhancing natural capital, efficiently using resources, and stimulating the conservation of the country's natural ecosystems. In a green economy, income and employment growth are driven by public and private investments aimed at reducing carbon emissions and pollution, creating green jobs accessible to both women and men, improving living and health conditions, and increasing the efficiency of energy, resources, and ecosystem service use.

At the 2012 UN Conference on Sustainable Development, the Kyrgyz Republic expressed its commitment to sustainable development by promoting the priorities of a green economy. This transition is necessary for the Kyrgyz Republic, as the country's socio-economic development heavily relies on natural resource consumption. Recognizing the importance of transitioning to a green economy, Kyrgyz Republic adopted the "Concept of Kyrgyz Republic as a Green Economy Country", which was developed and approved by the resolution of the state parliament named Jogorku Kenesh on 28 June 2018[13].

12 https://cbd.minjust.gov.kg/111972/edition/979958/ru

13 https://cbd.minjust.gov.kg/453438/edition/1189681/ru

The Kyrgyz Republic is actively pursuing policies to develop and strengthen its economic potential in line with the main strategic directions and tasks in the National Sustainable Development Strategy - a national document outlining the country's development agenda.

In 2019, the Kyrgyz Republic adopted the Green Economy Development Program for 2019-2023. The program has identified seven priority areas: green energy, green agriculture, green industry, low-carbon and clean transport, sustainable tourism, waste management, and green cities. Green energy initiative aims to reduce the energy intensity of GDP while increasing access to reliable and modern energy supply for citizens and economic entities.

The key objectives include:

- Improving the evaluation and monitoring systems of the energy sector.
- Enhancing energy policies.
- Increasing the transparency and profitability of the fuel and energy sector.
- Boosting energy consumption efficiency.
- Improving the energy efficiency of buildings.
- Increasing the share of renewable energy sources in total final energy consumption.
- Raising public awareness about energy saving and renewable energy.

Enhancing energy supply quality and reliability amidst limited natural gas and oil resources and a deficit of hydropower-generated electricity, especially in winter, necessitates the rapid implementation of energy-saving measures, improved energy sector management, and accelerated deployment of additional generating capacities, including large hydropower plants and renewable energy sources.

To develop renewable energy in the Kyrgyz Republic, feasibility assessments will determine their implementation potential at the district level based on energy supply costs through the national grid, the potential and costs of renewable energy sources, and projected energy demand growth until 2040. Expected outcomes include:

- Reducing GDP energy intensity by 4.5%
- Lowering energy consumption in residential, public, administrative, and non-industrial buildings by 10%
- Decreasing distribution losses to 13%
- Eliminating 100% of commercial losses
- Commissioning renewable energy facilities with at least 50 MW capacity
- Ensuring transparency, effective management, and financial sustainability of energy companies
- Attracting over $300 million in private investments to the energy sector
- Providing reliable energy and fuel supplies to the population
- A sustainable and efficient system for training and professional development is operational in the country
- The business sector and the population are actively utilizing and implementing energy-efficient technologies.

One of the strategic measures for green energy is the implementation of renewable energy sources (RES). The Law of the Kyrgyz Republic "On Renewable Energy Sources" dated June 30, 2022, No. 49 (hereinafter referred to as the "RES Law") was adopted, identifying RES as sources of continuously renewable types of energy, including solar energy, geothermal energy, vacuum energy, wind energy, and hydropower.

According to the National Energy Program of the Kyrgyz Republic for 2008-2010 and the Strategy for the Development of the Fuel and Energy Complex until 2025, approved by Resolution No. 346-IV of the Jogorku Kenesh on April 24, 2008 (hereinafter referred to as the "National Energy Program"), the practical use of RES currently remains minimal, accounting for less than 1% of the country's energy balance. According to the National Energy Program, the total hydropower potential of 172 rivers and streams in the country, with water flow rates of 0.5 to 50 cubic meters per second, exceeds 80 billion kWh per year, of which 5-8 billion kWh per year are technically feasible for development. Given the growing annual electricity deficit during winter, which exceeded 2 billion kWh in 2023, developing small hydropower plants and other RES could fully cover the increasing electricity deficit.[14]

By Presidential Decree No. 178 of July 24, 2023, a state of emergency in the energy sector of the Kyrgyz Republic was declared, effective from August 1, 2023, until December 31, 2026 (hereinafter referred to as the "Energy Emergency Decree")[15] The decree cites the need for urgent measures to address the energy crisis caused by climate challenges, low water inflow in the Naryn River basin, a lack of generating capacities, and the rapid growth of energy demand. The declaration of the state of emergency further underscores the importance and urgency of the issues discussed in this document.

To promote the adoption and development of RES, amendments to the RES Law came into force on August 31, 2023, including:

- Extending the preferential period for solar and wind power plants from the current 15 years to 25 years while retaining the 15 years for small hydropower plants.
- During the preferential period, the electricity tariff for RES installations will be calculated by multiplying the tariff determined by the government's tariff policy by 1.3 (the same as the previous factor).
- A key innovation for potential investors is the introduction of annual tariff indexation based on changes in the exchange rate of the Kyrgyz som to foreign currencies. The Cabinet of Ministers will determine the specific procedure for indexation. Meanwhile, the existing annual tariff indexation based on inflation rates will be abolished.
- Additional costs incurred by the National Electric Grid of Kyrgyz Republic (NEGK) for purchasing electricity generated using RES will be compensated through the Green Energy Fund under the Cabinet of Ministers.

14 https://unece.org/fileadmin/DAM/project-monitoring/unda/16_17X/E2_A2.3/NSEAP_Kyrgyzstan_ENG.pdf

15 https://www.gov.kg/ru/programs/16.

- The Ministry of Energy will be able to implement auction mechanisms with downward adjustments to purchasing tariffs for RES installations. This provision is new to Kyrgyz legislation, so tariff auction mechanisms did not exist. However, the procedure for conducting auctions is yet to be adopted and must be developed by the Cabinet of Ministers.

As a result of this program, the country's energy sector has undergone significant changes. The Law of the Kyrgyz Republic, "On Renewable Energy Sources", dated June 30, 2022, No. 49 was adopted. According to this law, renewable energy sources include continuously replenishable energy types such as solar, geothermal, wind, and hydropower. The law also established compensation from the Green Energy Fund under the Cabinet of Ministers to cover the additional costs incurred by PJSC "NESK" for purchasing electricity generated using renewable energy sources.

In the Kyrgyz Republic, several energy projects have been implemented or are in progress, financed by international donors, including:

- The Master Plan for the Comprehensive Development of the Energy Sector of the Kyrgyz Republic for 2020–2024 includes objectives such as Renewable Energy and Energy Efficiency.
- The reconstruction and modernization of existing facilities within the Toktogul Hydropower Cascade.
- The high-voltage transmission line "CASA-1000" was constructed in the Batken, Osh, and Jalal-Abad regions. The project involves the construction of a 484 km high-voltage alternating current transmission line from the Datka substation in Kyrgyzstan to the Sughd substation in Tajikistan for exporting Kyrgyz electricity. Construction began in 2021 and was completed in November 2024. The line consists of 1,243 towers, a 456 km transmission line, and a cell at the Datka substation[16].
- Reconstruction and construction of small and medium hydropower plants (e.g., new Karakul and Tarsk HPPs with substations and reconstruction of the existing Bystrovsk HPP).
- Strengthening the capacity of JSC "Chakan HPP".
- Preparing and integrating renewable energy projects into the grid by expanding and enhancing electrical networks, facilitating the integration of hydro and solar power, and providing technical assistance to the Ministry of Energy, PJSC "National Electrical Grid of Kyrgyzstan (NEGK)," and other key stakeholders. Activities include developing and implementing grid standards, such as connection rules for renewable energy generation, reviewing policies and regulations for renewable energy development, and implementing short-term forecasting measures. This also includes plans to construct the Isanova 220 kV substation and 220-110 kV power lines.
- Projects under various agencies that introduce energy efficiency principles in building construction.

16 https://casa-1000.kg/tpost/ugy0dij1a1-novaya-epoha-v-energetike-kirgizstan-zav

Other initiatives include:

- Implementing tariff policies by adjusting electricity rates and subsidies (both commercial and social).
- Construction of small hydropower plants by investors and private entities.
- Transitioning the state vehicle fleet to electric vehicles.
- Developing policies to promote renewable energy sources and improve building energy efficiency through the adoption of laws.

3.4 Environmental Law

3.4.1 Constitution of Kyrgyzstan

The constitution of Kyrgyz Republic (dated 2021) has the following provisions relating to environmental and social aspects:

Article 16

- Land, subsoil, airspace, waters, forests, pastures, flora and fauna, and other natural resources are the exclusive property of the Kyrgyz Republic.
- Land and natural resources are utilized as the basis for the life and activities of the people of the Kyrgyz Republic; to preserve the unified ecological system and ensure sustainable development, they are under state control and special protection.
- Land, except for pastures and forests, may be in private and municipal ownership.
- Guarantees for the protection of landowners' rights are defined by law.

Article 49

- Everyone has the right to an environment favourable for life and health.
- Everyone has the right to compensation for harm caused to their health or property by activities related to using natural resources.
- Everyone must carefully protect and treat the natural environment, flora, and fauna.

3.4.2 Law on Nature Protection, 1999, as Amended in 2024

The fundamental law of the Kyrgyz Republic is the Law On “Environmental Protection" dated June 16, 1999, No. 53 (as amended and supplemented on June 13, 2024, No. 95), which defines the policy and regulates legal relations in the field of environmental protection and natural resource use in the Kyrgyz Republic.

Every citizen has the right to an environment favourable for life and health and compensation for damage caused to their health or property by adverse environmental impacts from economic or other activities.

The following are subject to protection from pollution, damage, depletion, destruction, degradation, and other negative impacts: land and its subsoil, soil cover, waters, forests, flora and fauna and their genetic resources, atmospheric air, other natural objects, complexes and ecosystems, as well as the climate, ozone layer, and the Earth as a planet as a whole.

The main principles of environmental protection are:

- Principle of priority: Ensuring fundamental guarantees for protecting human rights to an environment favourable for life, work, and recreation, which supports human life and health.
- Principle of balance: Maintaining the stability of ecological systems, observing environmental protection rules in economic and other activities, replenishing natural resources, and preventing irreversible consequences for the environment and human health.
- Principle of comprehensiveness: A harmonious, scientifically grounded combination of ecological, economic, and social interests of society, a comprehensive approach to addressing resource conservation and environmental protection issues.
- Principle of restraint: Regulation, mandatory environmental impact assessments, justification and limitation of the effects of economic activities and other influences on the environment.
- Principle of responsibility: Strict adherence to environmental protection laws, the inevitability of accountability for violations, and compensation for damage caused to the environment by enterprises, institutions, organizations, farms, and citizens.
- Principle of openness: Transparency in addressing environmental issues in economic and other activities with ecological consequences, close collaboration with public organizations and the population, encouragement, and promotion of measures aimed at protecting and rationally using natural resources, and balancing national, regional, and international interests in the field of environmental protection.

3.4.3 Law on Environmental Control, 2009 as Amended in 2019

The Law of the Kyrgyz Republic establishes technical regulation in the field of environmental safety, “General Technical Regulation on Ensuring Environmental Safety in the Kyrgyz Republic" dated May 8, 2009, No. 151 (as amended and supplemented on July 8, 2019, No. 83). This law includes general requirements for ensuring environmental safety during the design and implementation of activities at facilities involved in economic and other activities, as well as for the processes of production, storage, transportation, and disposal of products.

The requirements of this technical regulation apply to the production, storage, transportation, and disposal of products and are mandatory for all legal entities and individuals engaged in such processes.

The objects regulated by this technical regulation include production processes used or intended to be used at facilities involved in economic or other activities, which are classified as hazardous or require an EIA for planned activities, as well as processes for storing, transporting, and disposing of products.

According to **Article 6**, technical regulation in the field of environmental safety is carried out based on the following principles:

- Mandatory State Environmental Expertise and environmental impact assessments before

making decisions on economic and other activities
- Acceptable Levels of Environmental Impact: Ensuring compliance with environmental safety requirements for the level of impact from economic and other activities on the environment
- Reduction of Negative Impact: Minimizing the adverse environmental effects of production processes from economic and other activities by using the best available technologies, considering economic and social factors, and the rational use of natural resources
- Prohibition of Activities with Unpredictable Consequences: Banning production processes and other activities with unpredictable environmental consequences, as well as projects that may lead to negative environmental impacts
- Priority of Preserving Natural Ecological Systems: Giving precedence to the protection of natural ecological systems
- Principle of Openness: Transparency in the planning and implementation of production processes with environmental consequences, close collaboration with public organizations and the population, and encouragement of measures aimed at protecting and rationally using natural resources

In the Kyrgyz Republic, an environmental expertise (EE) process is conducted during the design and implementation of economic and other activities to prevent potential adverse environmental impacts from such activities and are regulated by the Law of the Kyrgyz Republic “On Environmental Expertise" dated June 16, 1999, No. 54 (as amended and supplemented as of May 4, 2015).

The objectives of the EE are:

- Prevention of the potential negative impacts of planned administrative, economic, and other activities on public health and the environment.
- Assessment of the compliance of planned administrative, economic, investment, and other activities with environmental protection legislation at stages preceding decisions on their implementation and during their construction and execution.

National Environmental Impact Assessment (EIA)

The specially authorized state body for environmental expertise is the republican state environmental protection authority of the Kyrgyz Republic. The procedure for conducting state EE is regulated by the “Regulations on the Procedure for Conducting State Environmental Expertise”, approved by the Government of the Kyrgyz Republic on May 7, 2014, No. 248.

A positive conclusion from the state EE is one of the mandatory conditions for financing, crediting, investing in, or implementing the object under review. The legal consequence of a negative conclusion from the state EE prohibits the object under review.

Energy facilities, such as high-voltage overhead transmission lines, fall under the types of economic activities subject to Environmental Impact Assessment (EIA) and mandatory state EE. The procedure for conducting an EIA for proposed activities is established by the “Regulations on Environmental Impact Assessment in the Kyrgyz Republic” approved by the Government of the Kyrgyz Republic on

February 13, 2015, No. 60. The goal of the EIA is to prevent and/or mitigate the impact of proposed activities on the environment and associated social, economic, and other consequences.

Participants in the EIA process include:

1. The project initiator
2. The entity performing the EIA work
3. Local state administrations and local self-governing bodies
4. The authorized state body in the field of environmental protection and/or its territorial bodies
5. The public (public organizations, population)

The EIA process consists of four stages:

1. Decision on the need for an EIA (screening to determine whether EIA is required)
2. Preliminary EIA (Pre-EIA) for the feasibility study stage
3. EIA (Detailed EIA) for the working project stage
4. Post-project analysis (conducted one year after the start of activities)

The project initiator submits the EIA documentation as part of the project documentation for state EE and formal approval. <u>For this project, a third party will perform the national EIA as part of the ongoing feasibility study.</u>

3.4.4 Alignment of ESIA and National EIA reports

The **first stage** of the EIA process is deciding whether an EIA is necessary. At this stage, it is determined whether the planned activity needs to be assessed for its environmental impact, including potential transboundary effects. The project initiator makes the decision based on a list of activities subject to EIA.

- Full-scale EIA is mandatory for activities classified as Category I hazards and projects with potentially significant transboundary impacts.
- A reduced EIA is conducted for activities classified under Categories II and III hazards.
- For projects with minimal environmental impact, a completed Environmental Impact Statement (EIS) form for the working project is sufficient.

The **second stage** of the EIA is the preliminary EIA phase, which accompanies the project's feasibility study. It involves a comprehensive analysis of potential project impacts, alternative options assessment, and an Environmental Management Plan development. This report includes:

1. A brief description of the proposed activity.
2. An assessment of the current state of the environment within the potential impact zone.
3. An evaluation of potential environmental impacts from the proposed activity.
4. An assessment of the environmental impact of alternative options for the proposed activity.
5. Forecasting and assessment of environmental changes during construction, operation, and decommissioning.
6. Development of measures to prevent, minimize, and/or compensate for significant

environmental harm during all project phases.

7. Conclusions based on the EIA results.
8. An Environmental Impact Statement (EIS).

It is necessary to highlight, that based on local regulation, public hearings must be conducted in accordance with the procedure indicated in the law, represent all environmental impact assessments (to be justified by calculations) for construction and operation phases (if applicable).

The **third stage** is the detailed EIA, conducted alongside project design documentation (e.g., design and working project stages). It includes:

1. A refined comprehensive assessment of the impact of the chosen implementation plan.
2. Refined technical solutions and measures to prevent, mitigate, and minimize the environmental and public health impacts during project operation and decommissioning.
3. A resource-backed program for monitoring and controlling environmental components during all project phases.
4. Project norms for emissions, discharges of pollutants, and waste management.
5. An Environmental Consequences Statement (ECS).

The results of the detailed EIA are included in the project feasibility documentation as a section titled "Environmental Protection".

The **fourth stage** is the post-project analysis, conducted one year after project commencement to confirm the project's environmental safety and adjust environmental protection measures. It includes:

1. Comprehensive studies to evaluate the effectiveness of planned environmental measures and to ensure environmental and public safety.
2. A post-project analysis plan developed based on EIA materials and approved by regional environmental protection authorities.
3. The project initiator organizes and oversees the analysis.
4. The analysis is conducted by a specialized organization (research, design, or another firm).
5. The results are documented in a report containing specific proposals for minimizing adverse environmental impacts and amending existing norms and permits. The report includes supporting data such as measurements, lab analyses, photos, and interviews.
6. The report is submitted to the project initiator for necessary actions to reduce environmental impacts. It must also be accessible to the design organization, EIA implementers, environmental authorities, and the public.
7. Upon request, the project initiator informs the public about the analysis results.

EIA documentation must include:

1. Details of the project initiator and the EIA implementer.
2. A description of the proposed activity and its justification.
3. An environmental impact assessment conducted during one of the EIA stages.

4. Materials on public information and input, documented with protocols and conclusions from public discussions.
5. Main conclusions of the EIA process.
6. Environmental Impact Statement (EIS).
7. Environmental Consequences Statement (ECS).
8. Appendices (maps, diagrams, research data, lists of involved organizations, etc.).
9. A list of legal, technical, and methodological documents governing natural resource use and environmental protection, used during the EIA process.

3.5 Applicable E&S Legislation and Standards

3.5.1 Environment

The following Laws are relevant to the Project:

- The Law of the Kyrgyz Republic On "Environmental Protection" dated June 16, 1999, No. 53 (as amended and supplemented on June 13, 2024, No. 95)
- The Law of the Kyrgyz Republic No. 151 "General Technical Regulation on Ensuring Environmental Safety in the Kyrgyz Republic", dated May 8, 2009 (as amended of July 8, 2019)
- The Law of the Kyrgyz Republic dated June 20, 2001, No. 53 "On the Protection and Use of Plant Resources" (as amended and supplemented as of March 23, 2020)
- The Law of the Kyrgyz Republic dated June 17, 1999, No. 59 "On Wildlife" (as amended and supplemented as of March 23, 2020)
- The Law of the Kyrgyz Republic No. 181 "On Production and Consumption Waste", dated August 15, 2023
- The Land Code of the Kyrgyz Republic dated June 2, 1999, No. 45 (as amended and supplemented as of August 5, 2022)
- The Forest Code of the Kyrgyz Republic dated July 8, 1999, No. 66 (as amended and supplemented as of February 7, 2024)
- The Law of the Kyrgyz Republic "On the Conversion (Transformation) of Land Plots" dated July 15, 2013, No. 145 (with the latest amendments as of October 21, 2024)
- The Law of the Kyrgyz Republic dated January 11, 2001, No. 4 "On the Management of Agricultural Lands" (as amended and supplemented as of August 4, 2020)
- The Law of the Kyrgyz Republic "On Water" dated January 14, 1994, No. 1422-XII (with the latest amendments and supplements as of April 5, 2019)
- Sanitary and Epidemiological Rules and Standards (SanPiN), approved by the Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201.

3.6 Applicable National Environmental Standards

3.6.1 Air Quality

Ambient Air Quality Standards, or MPCs, are established by the Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Hygienic standards "Approximate Safe Levels of Pollutant Exposure in the Atmospheric Air of Populated Areas" according to Appendix 15). The law provides lists of substances and permissible concentrations. Table 15 presents the MPC for primary pollutants relevant to the Project.

To meet the Lender standards for air quality, reference is made to the World Bank Group (WBG) General Environmental, Health, and Safety Guidelines (EHS Guidelines - General). These ambient air quality standards are based on World Health Organization (WHO) guidelines.

As part of the ESIA, the most stringent standards between national and international guidelines will be applied as “project standards” and defined in the ESIA.

Table 15: Ambient Air Quality MPCs

Pollutant	**Regulation**	**MPC (μg/m³)**				
		One-time	**Hourly**	**24 hours**	**Annual**	**Most stringent**
Nitrogen Dioxide (NO_2)	National	85	-	40	-	10
	WHO	-	200	25	10-	
Sulphur Dioxide (SO_2)	National	500	-	50	-	40
	WHO	-	-	40	-	
Carbon Monoxide (CO)	National	5000	-	3000	-	3000[17]
	WHO	-	-	10000	-	
PM2.5	National	160	-	160	-	5
	WHO	-	-	15	5	
PM10	National	300	-	30p	-	15
	WHO	-	-	45	15	

3.6.2 Noise

National noise standards are set out by the Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Sanitary Rules and Standards “Noise in Workplaces, Residential and Public Buildings, and Residential Areas” according to Appendix 14) and by other standard documents. The admissible noise level in the living area, inside and outside the buildings, is used to ensure the rules of acceptable noise levels for residential and other areas in the Kyrgyz Republic. These rules and regulations establish permissible noise parameters for residential and public buildings and general requirements for measurements and measurement methods. Evaluation of the sound level at the calculation point is performed for the day and night period of the day (from 7:00 to 23:00 hours and from 23:00 to 7:00 hours) and considers the maximum intensity of the sound source level during the half-hour period

Table 16 presents the permissible noise levels for the premises most relevant for the project.

17 Maximum daily 8-hour mean

Table 16: National noise limits (Source: GOST 23337-78, SanPiN 2.1.2.1002-00)

Receptor	L_{aeq} (dBA)			
	Daytime 07.00-23.00		Night-time 23.00 – 07.00	
	Average	Max	Average	Max
Areas directly adjacent to residential buildings, polyclinics, dispensaries, rest homes, boarding houses, libraries, schools, etc.	55	70	45	60
Areas directly adjacent to hospitals and sanatoriums	45	60	35	50
Areas directly adjacent to hotels and dormitories	60	75	50	65
Recreational zones near hospitals and sanatoriums	35	50	35	50
Recreational zones in residential micro-districts, construction of cottages, rest homes, sanatoriums, schools, retirement homes, etc.	45	60	45	60
Industrial; commercial	70		70	

The standard SN 2.1.8.562-96 "Noise in Workplaces, Residential and Public Buildings, and Residential Areas" encompasses a broad range of requirements related to environmental safety and comfort for the population and workers. The Table 17 represents the standard requirements:

Table 17: National noise level limits for working spaces (Source: SN 2.1.8.562-96)

Category of Work Intensity	Category of Physical Workload				
	Light Physical Work	Moderate Physical Work	Heavy Work 1st Degree	Heavy Work 2nd Degree	Heavy Work 3rd Degree
Light Intensity	80	80	75	75	75
Moderate Intensity	70	70	65	65	65
High-Intensity Work 1st Degree	60	60	-	-	-
High-Intensity Work 2nd Degree	50	50	-	-	-

To meet the Lender standards for noise, reference is made to the WBG EHS Guidelines. These state that noise impacts should not exceed the levels presented in Table 18 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Table 18: WBG Noise Level Guidelines

Receptor	One-hour L_{aeq} (dBA)	
	Daytime 07.00-22.00	Night-time 22.00 – 07.00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

The national standards are almost identical to WBG noise level guidelines, except for a slight variation in the definition of the start of "night-time". The WBG defined night-time as 22:00 instead of 23:00 under national standards. The WBG noise guideline limits will be used for the Project.

3.6.3 Water Quality

The Ministry of Water Resources, Agriculture, and Processing Industry of the Kyrgyz Republic is the authorized state executive body responsible for state policies in water resources. Relations in the field of use and protection of water resources (waters), prevention of environmentally harmful impacts of economic and other activities on water bodies and water management structures, improvement of their condition, and strengthening legality in water relations are regulated by the Law of the Kyrgyz Republic "On Water" dated January 14, 1994, No. 1422-XII (as amended and supplemented as of April 5, 2019).

The protection of water resources and the regime of economic activities and land use within Water Protection Zones (WPZs) and strips are regulated by the Regulations on Water Protection Zones and Strips of Water Bodies in the Kyrgyz Republic, approved by the Resolution of the Government of the Kyrgyz Republic dated July 7, 1995, No. 271.

- The width of the WPZ for rivers is established on both banks and is 50 meters.
- The width of the coastal water protection strip is 30 meters.

The following are prohibited within WPZs and coastal strips:

- Installation of containers with fuel and lubricants.
- Parking and washing of vehicles and machinery.
- Storage of industrial waste and other garbage.
- Discharge of untreated wastewater and other activities that negatively affect the condition of water bodies.

WPZs along the surface water courses of the rivers that interface with the Project route are defined in the relevant chapter of this ESIA, and prohibited activities will be defined in the management plans.

National water standards are set out by the Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Hygienic standards “Maximum Permissible Concentrations of Chemical Substances in Water Bodies for Domestic and Cultural Use” according to Appendix 16). The requirements are presented in Table 19.

Table 19: Standards and Maximum Permissible Concentrations (MPC) for water

№	Substance	MPC, mg/l
1	Al	0,2
2	Benzo(a)pyrene	0,5
3	V	0,1
4	Cd	0,001
5	Technical kerosene	0,01
6	Mg	50
7	Mn	0,1
8	Cu	1
9	As	0,01
10	Na	200
11	Pb	0,01
12	Sulfates	500
13	Sulfides and H2S	0,05
14	Chlorides	350
15	Zn	1

3.6.4 Soil Quality

Article 13 of the Law of the Kyrgyz Republic, dated May 8, 2009, No. 151, “General Technical Regulation on Ensuring Environmental Safety in the Kyrgyz Republic”, establishes environmental safety requirements for protecting soils and natural landscapes. Relevant requirements include:

- During activities involving disturbance of the soil cover, the fertile soil layer must be removed, stored, and subsequently used for land reclamation.
- Routes for temporary access roads must be planned with maximum use of the existing road network, considering local natural conditions.
- The movement of vehicles and specialized machinery is allowed only on specially constructed roads that ensure safe movement without causing damage to vegetation and soil cover.

Article 19 of the Law of the Kyrgyz Republic, dated June 20, 2001, No. 53, “On the Protection and Use of Plant Resources”, establishes requirements for combating soil erosion.

National standards for soil quality are set out by the Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Hygienic standards “Maximum Permissible Concentrations and Tentatively Permissible Quantities of Chemical Substances in Soil” according to Appendix 21). The requirements for the relevant contaminants are presented in Table 20.

Table 20: National requirements on soil quality

№	Substance	MPC (mg/kg) considering baseline conditions
1	Cd	0,5
2	Cu	33
3	As	2
4	Ni	20
5	Pb	32
6	Zn	55
7	Benzo(a)pyrene	0,02

3.6.5 Biodiversity legislation

The Law of the Kyrgyz Republic, dated June 20, 2001, No. 53, "On the Protection and Use of Plant Resources" (as amended and supplemented as of March 23, 2020) is the key legislation related to biodiversity protection. The law obliges individuals and legal entities to:

- Comply with the requirements for the protection and use of plant resources established by legislation and other regulatory legal acts.
- Prevent the deterioration of habitats for plant resources and adhere to environmentally friendly practices while collecting and harvesting wild plant materials.
- Avoid disrupting the integrity of natural plant communities, contribute to preserving their species diversity, and enhance the productivity of herbaceous and forest vegetation, seeds, fruits, and other products.

- Provide comprehensive assistance to state authorities responsible for maintaining the state cadastre, monitoring plant resources, and controlling the protection and use of plant resources.
- Prevent the degradation of other natural resources;
- Respect the rights of lessees, other temporary users, and neighbouring users of plant resources.
- Fulfil other requirements for the protection and rational use of plant resources as stipulated by the legislation of the Kyrgyz Republic.

The Law of the Kyrgyz Republic dated June 17, 1999, No. 59, "On Wildlife" (as amended and supplemented as of March 23, 2020).

When conducting state EE for projects involving the construction and reconstruction (expansion, technical re-equipment) of enterprises, facilities, and other structures, as well as the implementation of new equipment, technologies, materials, and substances, the impact on the condition of wildlife, migration routes, and reproduction conditions of animals must be considered.

The locations of enterprises, facilities, and other structures, as well as the introduction of new equipment, technologies, materials, and substances affecting the condition of wildlife, must be coordinated with the republican state environmental protection authority of the Kyrgyz Republic.

Forest Code of the Kyrgyz Republic dated July 8, 1999, No. 66 (as amended and supplemented as of February 7, 2024).

The forest legislation of the Kyrgyz Republic is aimed at protecting, preserving, and reproducing forests, ensuring their rational and sustainable use. This aligns with the national objectives of effective forest management, conserving the biodiversity of forest ecosystems, enhancing the ecological and economic potential of forests, and meeting societal needs for forest resources based on scientifically grounded, multifunctional forestry practices.

All forests and lands in state, communal, and private ownership designated for forestry form a unified Kyrgyz Republic forest fund. All forests and lands designated for forestry, except those in communal and private ownership, constitute the state forest fund.

Lands of the Forest Fund (Biodiversity)

Forest fund lands include:

- Forest lands: Lands covered with forest vegetation and those not covered but intended for forestry needs, such as sparse forest plantations, plantations, nurseries, clear-cut areas, burned lands, and open glades.
- Non-forest lands: Lands forming a single natural complex with forests, such as agricultural and other lands where forests were cleared for construction related to economic activities, roads, firebreaks, power line routes, and pipelines.

The boundaries of forest fund lands, separating them from other land categories, are determined according to the legislation of the Kyrgyz Republic.

The ESIA will define any Forest fund land relevant to the Project.

Not Included in the Forest Fund

The following are not part of the forest fund:

- Individual trees and groups of trees, shrub vegetation, and agroforestry plantations on agricultural lands.
- Protective plantations along railway and road rights-of-way, canals, and other linear structures.
- Individual trees, groups of trees, and shrubs in urban greening areas and other settlements (excluding urban forests), as well as on household, dacha, and garden plots.

The creation, maintenance, use, and protection of plantations not included in the forest fund are carried out following procedures established by local self-governance bodies and local state administrations unless otherwise specified by the legislation of the Kyrgyz Republic.

During the exploration, design, construction, and commissioning of new or reconstructed enterprises, facilities, and other objects, as well as the implementation of new technological processes affecting the condition and reproduction of forests, measures must be taken to protect forests from negative impacts such as wastewater, chemicals, industrial and municipal emissions, waste, and other harmful influences.

The locations of enterprises, facilities, and other objects affecting forests must comply with current legislation and require positive conclusions from the state environmental expertise and the republican state forestry management authority, as well as other specially authorized state bodies.

According to Article 12 of the **Law of the Kyrgyz Republic, "General Technical Regulation on Ensuring Environmental Safety in the Kyrgyz Republic"**, for preserving wildlife and plant resources during the design, construction, and operation of high-voltage power transmission lines. Measures noted as relevant to the project are as follows:

1. Clearing of tree and shrub vegetation corridors for construction is prohibited during animal breeding periods.
2. Measures must be implemented to protect wildlife, including restricting work during periods of mass migration, in breeding and moulting areas, during the rearing of young, spawning, foraging, and migration of fish fry.
3. Measures must be taken to prevent and reduce the risk of bird fatalities due to contact with live wires at points of attachment to support structures. Transmission lines, poles, and insulators must be equipped with special bird protection devices, including those that prevent birds from nesting in areas where they could encounter live wires. The use of uninsulated metal structures as bird protection devices is prohibited.
4. Sanitary protection zones must be established along power transmission lines to prevent the

death of wildlife due to the impact of electromagnetic fields (EMFs).

3.6.6 Waste Management

Environmental safety requirements for the management of production and consumption waste during the design, construction, operation, reconstruction, conservation, and decommissioning of facilities for economic and other activities must include designated areas for the collection and/or accumulation of waste, equipped following the requirements established by special technical regulations.

The **Law of the Kyrgyz Republic "On Production and Consumption Waste",** dated November 13, 2001, No. 89, defines state policy in production and consumption waste management. It aims to prevent the negative impact of such waste on the environment and human health during handling and maximize its integration into the economic cycle as an additional source of raw materials.

Waste is classified into hazard classes as follows:

- First (I) hazard class – extremely hazardous
- Second (II) hazard class – highly hazardous
- Third (III) hazard class – moderately hazardous
- Fourth (IV) hazard class – low hazardous
- Fifth (V) hazard class – practically non-hazardous

The hazard classes of waste are specified in the Waste Classifier, approved by the Resolution of the Government of the Kyrgyz Republic dated January 15, 2010, No. 9 (with the latest amendments and additions dated April 25, 2024, No. 201).

Ownership rights to waste are acquired by:

- State authorities, local state administrations, and local self-government bodies: from the moment waste is deposited in specially designated collection areas (trash bins, containers, and landfills) unless otherwise stipulated by the legislation of the Kyrgyz Republic and/or an agreement regarding the use of property that served as the source of the waste generation.
- A legal or natural person, including an individual entrepreneur, based on a transaction transferring ownership of the waste or through other actions that indicate the transfer of waste ownership in another manner.

When collecting waste, it is necessary to separate waste by types (metal, glass, textiles, paper, plastic, rubber, food waste, etc.).

Waste processing must be carried out in an environmentally safe manner. Facilities for waste processing that have been commissioned must be registered in the registry of waste processing facilities following the procedure established by the Cabinet of Ministers of the Kyrgyz Republic. The EPR (Extended Producer Responsibility) operator maintains the waste processing facility registry. The operation of waste processing facilities not included in this registry is prohibited.

Waste neutralization must be carried out only at waste neutralization facilities operated in compliance with the requirements established by this Law and other regulatory legal acts in the field of waste management and environmental protection.

Biological waste must be obligatorily destroyed by incinerator incineration (cremation) starting from January 1, 2025. Disinfection in biothermal pits (Beccari pits) followed by burial of the remains in the ground is allowed in cases determined by the Cabinet of Ministers of the Kyrgyz Republic. In the event of mass animal deaths due to natural disasters and the impossibility of transportation for utilization, incineration, or disinfection in biothermal pits (Beccari pits), burial of carcasses in the ground is permitted.

Activities by legal and natural persons, as well as individual entrepreneurs, involving the transportation (including transboundary), handling, processing, neutralization, and disposal of waste of hazard classes I-V are subject to licensing following the Law of the Kyrgyz Republic "On the Licensing and Permitting System in the Kyrgyz Republic" dated October 19, 2013, No. 195 (with the latest amendments and additions as of July 29, 2024, No. 151).

Unauthorized disposal of waste that may be a source of environmental pollution and its burning on the premises of enterprises, institutions, organizations, and populated areas is prohibited.

3.6.7 Electro-magnetic fields (EMF)

Council recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC) (CD 1999) and IFC EHS General guideline refers to guidance from the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which establishes the following exposure levels for EMF: [18] [19] [20]

- public exposure to electric field as 5 kV/m and for magnetic fields 100 micro Tesla
- occupational exposure to electric fields as 10 kV/m and magnetic fields and 500 micro Tesla

CD 1999 also states that for compliance with CD 1999, consideration as to the significance of the time of exposure and the duration of exposure are important in considering risk.

3.6.8 Land rights, acquisition and resettlement

The following land Laws are relevant to the Project:

18 ICNIRP (1998). Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz). Health Phys, 74(4), 494-522

19 Application of ICNIRP Exposure Guidelines for 50 Hz Power Frequency Fields" http://www.hpa.org.uk/webw/HPAwebandHPAwebStandard/HPAweb_C/1195733805036?p=1158934607693

20 EU, 1999. Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz – 300 GHz). Official Journal of the European Communities 1999/519/EC.

- Civil Code of the Kyrgyz Republic - establishes the fundamental concepts of property rights.
- Land Code of the Kyrgyz Republic, dated June 2, 1999, No. 45 - defines the regulations for land withdrawal for civil needs.
- Forest Code of the Kyrgyz Republic, dated July 8, 1999, No. 66 - governs specific legal relations concerning forest fund lands.
- Law of the Kyrgyz Republic "On the Conversion (Transformation) of Land Plots" dated July 15, 2013, No. 145 - establishes rules for transitions between land categories.

Law of the Kyrgyz Republic dated January 11, 2001, No. 4, "On the Management of Agricultural Lands" - governs specific legal relations concerning agricultural land.

3.6.9 Land acquisition process in Kyrgyz Republic

Land plots can be acquired for state and public needs following the Land Code of the Kyrgyz Republic. Acquisition of a land plot for state and public needs may be carried out based on an agreement between the authorized body and the owner of the land plot or land user. In the event of disagreement between the land plot owner or the land user regarding the acquisition or its terms, the authorized body has the right to apply to the court within two months with a claim for expropriation of the land plot from the moment of receipt of the refusal. Until the court decides on the land plot's expropriation, the owner of the land plot or land user has the right to exercise their rights to the plot and make the necessary expenses to ensure the use of the land plot following its intended purpose.

The owner of the land plot or the land user bears the risk of the costs and losses associated with new construction, expansion or reconstruction of buildings and structures during the specified period. When determining the compensation price of the land plot, it includes the market value of the right to the land plot and the buildings and structures located on it, as well as the losses caused to the owner or land user in connection with the termination of the right to the land plot, including losses associated with the early termination of obligations to third parties.

When a land plot is allocated for state or public needs, with the consent of the owner of the land plot or land user, he may be provided with another land plot with the value of the right to it being offset against the compensation cost

4.4.2.1. Servitude / Right of Way

According to the provisions of the Code, a compulsory servitude may be established to ensure:

1) Access to the land plot if other access is impossible, extremely difficult or requires disproportionate expenses.
2) The laying and operation of power lines, communications, water supply, heat supply, land reclamation and other needs cannot be ensured without the establishment of a compulsory servitude.

A servitude may be established by agreement of the parties (voluntary servitude) or, if necessary, based on a decision of an authorized body (compulsory servitude). Encumbrance of a land plot with a servitude does not deprive the owner of the land plot or the land user of the right to the land plot.

Compensation for damages caused to the owner of a land plot or land user by establishing a compulsory servitude shall be subject to compensation by the entity whose interests the servitude is established. The authorized body shall determine the amount of damages and, in case of land plot owner or land user disagreement, by the court. The owner of a land plot or land user whose land plot is acquired by a compulsory servitude has the right, instead of compensation for damages, to demand a proportionate fee from the entity in whose interests the servitude is established.

4.4.2.2. Forestry land (Land rights)

Forest legislation, as outlined in the Forest Code of the Kyrgyz Republic dated July 8, 1999, No. 66 (as amended and supplemented as of February 7, 2024), is aimed at protecting, conserving, reproducing, and sustainable use of forests.

All forests and lands in state, communal, and private ownership allocated for forestry purposes form the unified forest fund of the Kyrgyz Republic. All forests and lands provided for forestry needs, except for forests in municipal and private ownership, form the state forest fund. Following the constitutional provision on the right of private ownership of land in the Kyrgyz Republic, private forest lands are allowed on the condition of providing land plots in private ownership for artificial forest cultivation.

When forested land plots are expropriated for state or public needs, the issue of preserving or felling forest plantations and the procedure for utilizing the resulting timber is simultaneously resolved based on recommendations from the Republican State Forestry Management Authority.

4.4.2.3. Land Categorisation

The Law of the Kyrgyz Republic, "On the Conversion of Land Plots", dated July 15, 2013, No. 145 (as amended on October 21, 2024), regulates the conversion of land categorisation. This process is carried out following the provisions of the Land Code of the Kyrgyz Republic and other regulatory legal acts adopted in alignment with it. The conversion of land from one category to another is a state function and is implemented when the primary designated purpose of the land changes.

When agricultural land is converted from agricultural, forestry, water fund, or reserve land categories to other categories or types of land use unrelated to agricultural or forestry production, compensation for losses and lost profits is paid by the new land users or owners, except in cases specified by the law.

According to the Law of the Kyrgyz Republic dated January 11, 2001, No. 4, "On the Management of Agricultural Lands" (as amended and supplemented as of August 4, 2020), agricultural land in state ownership and leased out is expropriated for state purposes after payment of calculated costs and lost profits at the time of expropriation.

3.6.10 Archaeology and Cultural Heritage

According to the Law of the Kyrgyz Republic dated July 26, 1999, No. 91, "On the Protection and Use of Historical and Cultural Heritage", during the engineering and survey stages and when converting land to a different land category, organizations engaged in construction, roadworks, or significant landscape modifications are required to conduct an archaeological survey to determine the presence or absence of historical and cultural heritage objects on the affected territory (Article 32 of the Law "On the Protection and Use of Historical and Cultural Heritage")

3.6.11 National norms and standards for transmission lines

According to **Article 7** of the **Law of the Kyrgyz Republic "General Technical Regulation on Ensuring Environmental Safety in the Kyrgyz Republic",** environmental safety during the design, construction, and operation of projects, including high-voltage power transmission lines, is ensured through the following measures:

1. Using machinery and equipment with design characteristics and technological processes to reduce negative environmental impact, ensure personnel safety, and prevent accidents.
2. The application of effective methods and technologies for treating pollutant emissions and discharges, as well as waste disposal technologies, to minimize environmental impact levels.
3. Conducting an environmental impact assessment (EIA) for planned economic and other activities before deciding on their implementation following the environmental safety requirements established by this technical regulation.

Sanitary and Epidemiological Rules and Standards (SanPiN), approved by the Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201, also establish guidelines for the placement, design, construction, and operation of newly constructed, reconstructed, and existing industrial and energy facilities.

To protect the population from the electric fields generated by OHTLs, a **sanitary gap (SG) is** established along the high-voltage OHTLs routes, ensuring that the electric field intensity does not exceed **1 kV/m** outside these zones.

For newly designed OHTLs, as well as buildings and structures, the boundaries of the SGs along the OHTL routes, with horizontally arranged conductors and without electric field intensity reduction measures, are as follows (measured from the projection of the outer phase conductors onto the ground, perpendicular to the OHTL):

- 20 meters for OHTL with a voltage of 330 kV;
- 30 meters for OHTL with a voltage of 500 kV;
- 40 meters for OHTL with a voltage of 750 kV;
- 55 meters for OHTL with a voltage of 1150 kV.

Thus, for the 500 kV power transmission line "PS Kemin" - "PS Balykchy", an SG of 30 m on either side of the outermost conductor will be established. At the commissioning and operation stages, the SG can be adjusted based on the results of instrumental measurements. When commissioning a facility and during its operation, the sanitary gap must be adjusted based on the results of instrumental measurements. The SG prohibits permanent residential properties within this area and the routing will be designed to maintain at least 30 m at all times.

To ensure the safety of the population around facilities and operations that impact the environment and human health, a **sanitary protection zone (SPZ)** is established. This is a defined area with a restricted usage regime, whose size is designed to reduce pollution impacts on atmospheric air. For OHTLs, a SPZ is defined to ensure people and equipment maintain a safe distance from live electrical wires, as defined in regulation and based on the voltage level of the line.

3.7 Labour and Employment

Labour policy in the Kyrgyz Republic is implemented at the national government level and is reflected in the following relevant laws, regulations, and national social programs:

- **Constitution of the Kyrgyz Republic** (May 5, 2021)
- **Labour Code of the Kyrgyz Republic** (August 4, 2004, No. 106)
- **Law on Occupational Safety** (August 1, 2003, No. 167)
- **Law on Trade Unions** (October 16, 1998, No. 130)
- **Law on the Rights and Guarantees of Persons with Disabilities** (April 3, 2008, No. 38)
- **Resolution of the Government of the Kyrgyz Republic** (June 25, 1997, No. 374): "On the free provision of milk and other equivalent food products, soap, detergents, and disinfectants for workers in harmful working conditions."
- **Resolution of the Government of the Kyrgyz Republic** (October 11, 2011, No. 727): "On the approval of regulations for the appointment, payment, and size of temporary disability benefits, maternity benefits, and funeral benefits," with amendments from 2012, 2014, and 2016.
- **Resolution of the Government of the Kyrgyz Republic** (April 27, 2015, No. 258): "On the approval of regulations for establishing additional payments for heavy work and work in harmful or dangerous conditions, and a standard list of such jobs."
- **Resolution of the Government of the Kyrgyz Republic** (March 24, 2000, No. 158): "On the list of industries, jobs, professions, and positions with harmful and/or dangerous working conditions where women's labour is prohibited."
- **Resolution of the Government of the Kyrgyz Republic** (July 2, 2001, No. 314): "On the list of industries, professions, and jobs with heavy and harmful conditions where the labour of persons under 18 is prohibited," with amendments from 2005 and 2012.
- **Resolution of the Government of the Kyrgyz Republic** (July 1, 1996, No. 298): "On the approval of the list of industries, jobs, professions, positions, and indicators entitling workers to preferential pension benefits," with amendments up to 2021.
- **Regulations on the Organization of Occupational Safety Services and Work** (approved by Government Resolution No. 225 of April 5, 2004, with amendments from 2005).
- **Regulations on the Investigation and Reporting of Workplace Accidents** (approved by Government Resolution No. 64 of February 27, 2001, amended in 2020).
- **Regulations on Occupational Safety Training and Knowledge Assessment** (approved by Government Resolution No. 225 of April 5, 2004, with additions in 2013).

The Kyrgyz Republic became a member of the **International Labour Organization (ILO)** on March 31, 1992. Upon joining, the Kyrgyz Republic confirmed that the ILO conventions ratified by the USSR would remain in effect for Kyrgyz Republic following its independence from the USSR. The Kyrgyz Republic has ratified the following conventions:

Table 21: Labour Conventions ratified by Kyrgyz Republic

Convention	Date
Universal Declaration of Human Rights (1948)	1991
International Covenant on Civil and Political Rights (1966)	07-10-1994
Partnership and Cooperation Agreement with the EU (1996)	1999
ILO Convention 10 (Minimum Age in Agriculture, 1973)	06-07-1956 (USSR)
ILO Convention 11 (Right of Association and Organization in Agriculture, 1921)	06-07-1956 (USSR)
ILO Convention 17 (Workmen's Compensation for Accidents, 1925)	17-08-2004
ILO Convention 29 (Forced Labour, 1930)	23-06-1956 (USSR)
ILO Convention 45 (Underground Work for Women, 1935)	31-01-1961 (USSR)
ILO Convention 47 (40-Hour Workweek, 1935)	04-06-1956 (USSR)
ILO Convention 52 (Annual Paid Leave, 1936)	06-07-1956 (USSR)
ILO Convention 59 (Minimum Age in Industry, 1938)	06-07-1956 (USSR)
ILO Convention 60 (Revised Minimum Age for Non-Industrial Employment, 1937)	06-07-1956 (USSR)
ILO Convention 73 (Medical Examination of Seafarers, 1946)	18-06-1969 (USSR)
ILO Convention 77 (Medical Examination of Children for Industry Work, 1946)	06-07-1956 (USSR)
ILO Convention 78 (Medical Examination of Children for Non-Industrial Work, 1946)	06-07-1956 (USSR)
ILO Convention 79 (Night Work of Children in Non-Industrial Work, 1946)	06-07-1956 (USSR)
ILO Convention 81 (Labour Inspection in Industry and Commerce, 1947)	15-01-2000
ILO Convention 87 (Freedom of Association and Protection of the Right to Organize, 1948)	06-07-1956 (USSR)
ILO Convention 90 (Revised Night Work for Young Persons in Industry, 1948)	06-07-1956 (USSR)
ILO Convention 95 (Protection of Wages, 1949)	31-01-1961 (USSR)
ILO Convention 97 (Migration for Employment, 1949)	15-04-2003
ILO Convention 98 (Right to Organize and Collective Bargaining, 1949))	06-07-1956 (USSR)
ILO Convention 103 (Maternity Protection, 1952)	06-07-1956 (USSR)
ILO Convention 105 (Abolition of Forced Labour, 1957)	19-03-1998
ILO Convention 111 (Discrimination in Employment and Occupation, 1958)	31-01-1961 (USSR)
ILO Convention 115 (Radiation Protection, 1960)	05-08-1967 (USSR)
ILO Convention 118 (Equality of Treatment in Social Security, 1962)	12-01-1994
ILO Convention 150 (Labour Administration, 1978)	15-07-2003

Convention	Date
ILO Convention 182 (Worst Forms of Child Labour, 1999)	11-05-2004
ILO Convention 184 (Safety and Health in Agriculture, 2001)	30-12-2003
ILO Convention 190 (Violence and Harassment, 2019)	29-02-2024
CEDAW (Convention on the Elimination of All Forms of Discrimination Against Women)	10-02-1997

A legal and institutional framework has been established in national legislation following international conventions to prevent forced labour. The legislation of the Kyrgyz Republic (Constitution and Labour Code) prohibits child and forced labour use. Article 10 of the Labour Code explicitly bans forced labour under the threat of any form of coercion or violence, with exceptions made only for emergencies, military service obligations, or duties arising from the enforcement of a court sentence.

3.8 Lender requirements

3.8.1 EBRD Policy

The ESIA will principally consider the E&S requirements of EBRD as described in the following text:

- The European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy 2019 (ESP 2019);
- EBRD Performance Requirements (PRs):
- PR1 – Assessment and Management of Environmental and Social Risks and Impacts;
- PR2 – Labour and Working Conditions;
- PR3 – Resource Efficiency and Pollution Prevention and Control;
- PR4 – Health, Safety and Security;
- PR5 – Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
- PR6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- PR7 – Indigenous Peoples;
- PR8 – Cultural Heritage;
- PR10 – Information Disclosure and Stakeholder Engagement.

A summary of the overall objectives of each of the PRs is summarised below[21]:

PR1 - Assessment and Management of Environmental and Social Impacts and Issues

- Identify and evaluate environmental and social impacts and issues of the project;
- Adopt a mitigation hierarchy to address adverse environmental or social impacts and issues to workers, affected communities, and the environment from project activities;
- Promote improved environmental and social performance of clients through the effective use of management systems; and
- Develop an ESMS tailored to the nature of the project, for assessing and managing environmental and social issues and impacts in a manner consistent with relevant prs.

21 EBRD ESP 2019

PR2 - Labour and Working condition

- Respect and protect the fundamental principles and rights of workers;
- Ensure fair treatment, non-discrimination and equal opportunities of workers;
- Establish, maintain and improve a sound worker-management relationship;
- Promote compliance with any collective agreements to which the client is a party, national labour and employment laws;
- Protect and promote the safety and health of workers, especially by promoting safe and healthy working conditions; and
- Prevent the use of forced labour and child labour (as defined by the ILO) as it relates to project activities.

PR3 - Resource Efficiency and Pollution Prevention and Control

- Adopt the mitigation hierarchy approach to addressing adverse impacts on human health and the environment arising from the resource use and pollution released from the project;
- Avoid, minimise and manage the reduction of project-related greenhouse gas emission;
- Associated with hazardous substances and materials, including pesticides;
- Identify, where feasible, project-related opportunities for resource efficiency improvements associated with hazardous substances and materials;
- Including pesticides; and
- Identify, where feasible, project-related opportunities for resource efficiency improvements.

PR4 – Health, Safety and Security

- Protect and promote the health, safety and security of workers, by ensuring safe, healthy and secure working conditions and implementing a management system, appropriate to risks associated with the project; and
- Identify, assess, and manage health, safety and security risks to project affected communities and consumers during the project life cycle from both routine and non-routine activities.

PR5 - Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

- Avoid involuntary resettlement or, when unavoidable, minimise involuntary resettlement by exploring feasible alternative project designs and sites;
- Avoid forced eviction;
- Mitigate unavoidable adverse social and economic impacts from involuntary resettlement on affected persons use of and access to assets and land by:
- (i) providing timely compensation for loss of assets at full replacement cost
- (ii) ensuring that land acquisition, restrictions on land use, other assets and natural resources and involuntary resettlement activities are implemented with meaningful consultation, participation, and disclosure of information, in accordance with the requirements of PR 10;
- Restore or, where possible, improve the livelihoods and standards of living of affected persons compared to pre-displacement levels; and
- Improve living conditions among physically displaced persons through the provision of

adequate housing, including security of tenure at resettlement sites.

With relevance to this Project, this PR applies to restrictions that result in people experiencing loss of access to land, assets, natural resources or livelihoods, irrespective of whether such rights or restrictions are acquired through negotiation, expropriation, compulsory purchase, or employing government regulation (EBRD PR5, para 6).

PR6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources

- Protect and conserve biodiversity using a precautionary approach;
- Adopt the mitigation hierarchy (avoid, minimise, offset) approach, with the aim of achieving no net loss of biodiversity, and where appropriate, a net gain of biodiversity;
- Maintain ecosystem services; and
- Promote Good International Practice (GIP) in the sustainable management and use of living natural resources.

PR7 – Indigenous Peoples (IPs)

- Ensure that projects fully respect the dignity, rights, aspirations, cultures, customary laws and livelihoods of indigenous peoples;
- Both anticipate and avoid adverse risks and impacts of projects on the lives and livelihoods of indigenous peoples' communities or, when avoidance is not feasible, to minimise, mitigate, or compensate for such impacts;
- Promote sustainable development benefits and opportunities for indigenous peoples and establish and maintain an ongoing relationship with IPs affected by the project, ensure the effective participation of indigenous peoples in the design of project activities or mitigation measures that could potentially affect them either positively or negatively; and
- Ensure good-faith negotiation with IPs and obtain their free prior informed consent (FPIC).

PR8 - Cultural Heritage

- support the protection and conservation of cultural heritage;
- adopt the mitigation hierarchy approach to protecting cultural heritage from adverse impacts arising from the project;
- promote the equitable sharing of benefits from the use of cultural heritage in business activities; and
- where significant elements of cultural heritage are identified, promote the awareness, appreciation and enhancement of cultural heritage as well as potential socioeconomic benefits for local communities.

PR10 - Information Disclosure and Stakeholder Engagement

- outline a systematic approach to stakeholder engagement that will help clients build and maintain a constructive relationship with their stakeholders, in particular, the directly affected communities;
- provide means for effective engagement with the project's stakeholders throughout the

project lifecycle;
- ensure that appropriate environmental and social information is disclosed, and meaningful consultation is held with the project's stakeholders, and where appropriate, feedback provided through the consultation is taken into consideration; and
- ensure that grievances from affected communities and other stakeholders are handled appropriately.

3.8.2 EHS Guidelines

The EBRD PRs refer to the World Bank Group (WBG) Environment, Health and Safety (EHS) Guidelines as general guidance for implementing GIIP. The EHS Guidelines applicable to the Project include the following:

- WBG General EHS Guidelines (April 2007) - cover the four areas of the environment; occupational health & safety (OHS); community health & safety (CHS); construction and decommissioning.
- WBG EHS Guidelines Electric Power Transmission and Distribution (April 2007).

3.8.3 Good Industry Practice (GIP)

The Project will also follow the relevant requirements of the following GIP. Including, but not limited to the following that are specifically applicable to the Project:

- Voluntary Principles on Security and Human Rights (est. 2000); (http://www.voluntaryprinciples.org/);
- United Nations Guiding Principles for "Protect, Respect and Remedy" Human Rights Framework (2011); (https://www.business-humanrights.org/en/un-secretary-generals-special-representative-on-business-human-rights/un-protect-respect-and-remedy-framework-and-guiding-principles);
- United Nations Code of Conduct for Law Enforcement Officials; and (https://www.un.org/ruleoflaw/blog/document/code-of-conduct-for-law-enforcement-officials/);
- United Nations Basic Principles on the Use of Force and Firearms by Law;
- Use of Security Forces: Assessing and Managing Risks and Impacts (February 2017);
- Worker's Accommodation: Processes and Standards (Guidance Note by IFC and EBRD, 2009), and
- Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets, World Bank, 2007.

EBRD is committed to promoting the adoption of European Union (EU) environmental principles, practices and substantive standards by EBRD-financed projects, where these can be applied at the project level, regardless of their geographic location. When host country regulations differ from EU substantive environmental standards, projects will be expected to meet whichever is more stringent. Relevant EU Directives include:

- EIA Directive (2011/92/EU as amended 2014/52/EU) on the assessment of the effects of certain public and private projects on the environment;

- Council Directive 2009/147/EC on the conservation of wild birds13F[1]
- Council Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna (Habitats Directive); and
- Directive on Environmental Quality Standards in the Water Policy 2008/105/EC.

With reference to the EIA Directive, an EIA is mandatory for all projects which are considered as having significant effects on the environment and as listed in Annex I of the EIA Directive. This includes "*20. Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km"*1[2223].

3.9 International conventions and agreements

The following fundamental conventions (in addition to ILO conventions noted above, have been ratified by the Kyrgyz Republic (*Table 22*).

Table 22: List of conventions ratified by Kyrgyz Republic

Convention name
Environment / Climate Change
United Nations Framework Convention on Climate Change (UNFCCC), including the Paris Agreement (Ratified January 14, 2000, and November 11, 2019)
Convention on Biological Diversity, including the Nagoya and Cartagena Protocols (July 26, 1996, March 2, 2015, August 6, 2003)
United Nations Convention to Combat Desertification (UNCCD) (January 15, 2000)
Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (January 12, 2015)
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (January 18, 1996)
Convention Concerning the Protection of the World Cultural and Natural Heritage (June 2, 1995)
Convention for the Safeguarding of the Intangible Cultural Heritage (July 19, 2006)
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (November 30, 2006)
Convention on the Conservation of Migratory Species of Wild Animals (November 22, 2013)
Ramsar Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (April 10, 2002)
Vienna Convention for the Protection of the Ozone Layer (January 15, 2000)
Montreal Protocol on Substances that Deplete the Ozone Layer (January 15, 2000)
Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) (January 14, 2001)

22 https://ec.europa.eu/environment/nature/legislation/birdsdirective/

23 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011L0092

Convention name
Convention on Access to Information, Public Participation in Decision-Making, and Access to Justice in Environmental Matters (Aarhus Convention) (January 12, 2000)
Convention on Long-Range Transboundary Air Pollution (January 14, 2000)
Stockholm Convention on Persistent Organic Pollutants (POPs) (March 5, 2002)
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (January 15, 2000)
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (December 5, 2006)
United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-Making, and Access to Justice in Environmental Matters (January 12, 2001)
Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (August 17, 2004)

4 Baseline Conditions

4.1 Area of influence

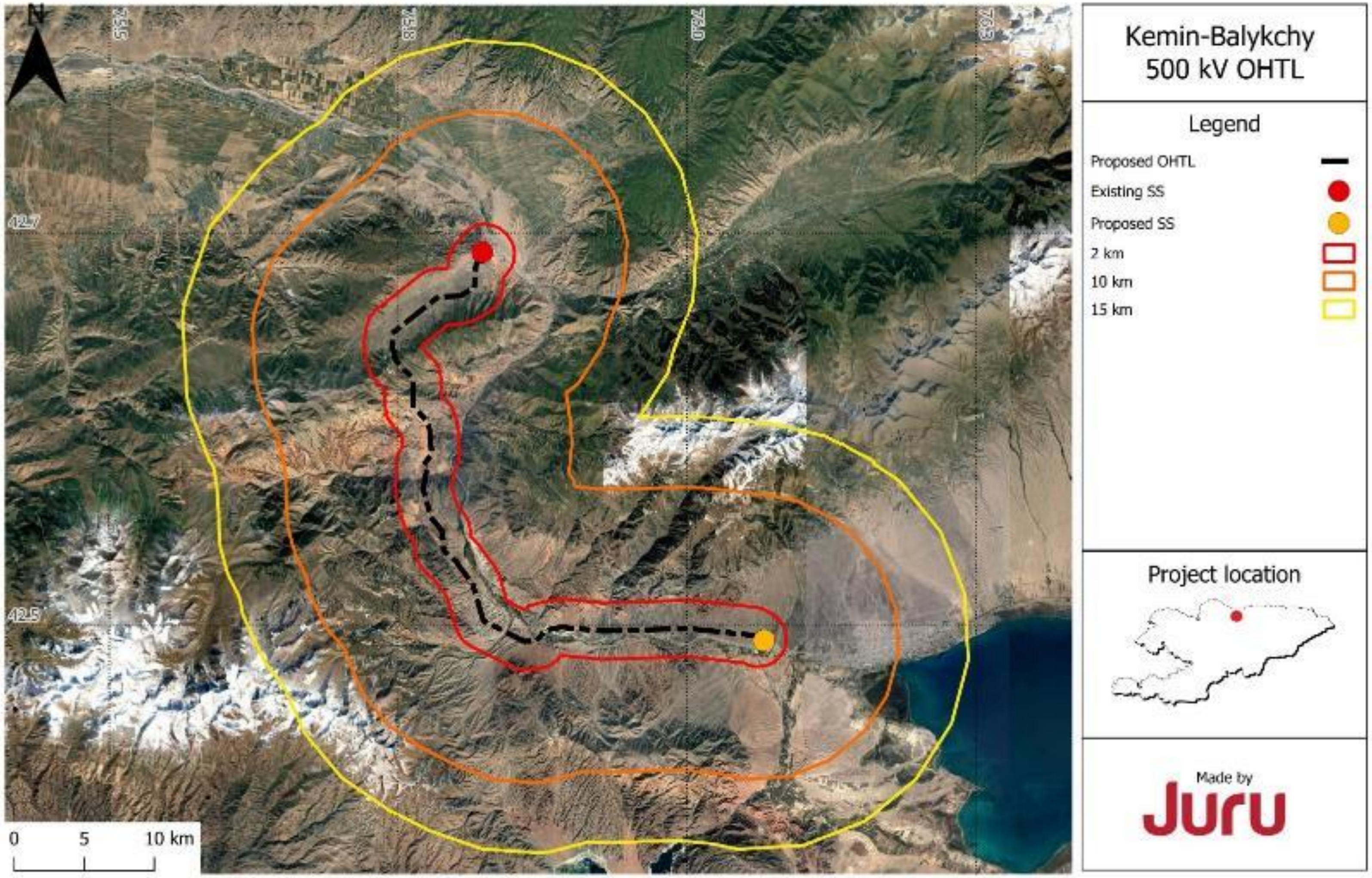
The Project Area of Influence (AOI) is defined as the area over which the impacts of the Project are likely to be felt including all its related or associated (where applicable) facilities such as the transmission line corridor (including safety setbacks), access roads to the ROW, aggregate borrow pits, accommodation facilities (where required) as well as any reasonably foreseen unplanned developments induced by the Project or cumulative impacts.

The Project AOI is comprised of areas of direct impacts and indirect impacts as follows:

- Direct area of influence considers the physical footprint of the project such as the site layout, work staging area and area affected during construction and operation works (e.g., traffic patterns).
- Indirect area of influence includes area which may experience project related changes in combination with activities not under the direct control of the project (e.g., inward migration, induced development, visitor influx, access to employment).

The Project direct AOI often varies depending on the specific environmental or social aspect considered based on the extent an impact may be affected and can be influenced on a spatial and temporal level ranging from confined to the AOI e.g. for electromagnetic field impacts and up to 5 km for potential avifauna impacts. Indicative AOI for 2, 10 and 15km are presented in Figure 47. Specific descriptions of the topic specific AOI will be provide din each impact assessment section.

Figure 47: Project AOI



4.2 Baseline data collection – summary of activities

Baseline data collection to inform the ESIA has been obtained from primary and secondary source information collected in a period between Springs of 2024 and 2025. Baseline reports are provided in Volume III, Technical Appendix.

- Desk-based review of laws, policies, reports from the relevant governmental and non-governmental institutions and existing national and international publicly available information data from websites.
- IBAT PS6 & ESS6 Report. Generated under licence 1781-26131 from the Integrated Biodiversity Assessment Tool on 17 January 2022 (GMT). www.ibat-alliance.org
- Scoping /ESIA site visit to identify physical, biological and socio-economic features on the Project site and 10 km AOI, in particular, to identify any: wells, boreholes on the Project infrastructure utilities such as network cables, OHTLs, gas pipelines, water pipelines etc waste municipal landfills, disposals in the vicinity of the Project site. Review of existing concrete batching plant in the area existing OHTLs crossing the Project site soil contamination and air emissions sources (anthropogenic) cases.
- Ground truth baseline locations for air, noise, soil and water baseline monitoring locations.
- Understand the existing road quality
- Check location of the structures on site indicated in the previous studies
- Perform terrestrial scoping ecology walk-over in the area of the project site and underground cable
- Perform consultations with local stakeholders and scoping meetings with local akimiyats
- Distribute Project leaflet with GRM information
- Baseline surveys and ESIA data collection
    - Noise baseline surveys - 16 – 20 November 2024; 13-17 April 2025 - 6 locations determined as nearest sensitive receptors (NSRs).
    - Air quality (CO, SO2, NO2, and PM2.5, PM10) - 16 – 20 November 2024; 13-17 April 2025 - 6 locations determined as NSRs
    - Water quality – 14 – 15 November 2024 - 5 locations (2 locations of surface water in the area near the planned Balykchy SS; 2 locations in the area of existing SS; 1 location for groundwater sampling in a village near the planned SS)
    - Soil quality - 14 – 15 November 2024; 3 April 2025 - 9 locations representative of the Project site.
- Biodiversity desk top review and fields studies as follows:
    - Flora and Habitats - 14-18 September 2024; 27-29 April 2025.
    - Birds VP survey – 27 March – 10 May 2024; 4-11 November 2024; 20 March – 14 April 2025 (two vantage points and visual/acoustic bird point count surveys at four locations).
    - Raptor nest -16 days between May-August 2024; 3-6 April 2025
    - Breeding bird - 26 April – 22 May 2024
    - Herpetofauna (amphibians and reptiles) – 20-23 September 2024; 24-25 April 2025
    - Mammals - 3-6 April 2025 for transect surveys and November 2024 – April 2025 for a camera trapping

  - Ichthyofauna - 27 – 29 March 2025
    - Bat roost - 16-17 April 2025
- Social baseline data desk top review and field studies as follows:
- Socio-economic survey - 3 – 11 April 2025 (130 households)
- Focus group discussions - 3 - 7 April (3 FGDs in villages in the vicinity to Project Site)
- Key informant interviews - 3 - 7 April (10 KIIs)
- Archaeological Field Studies by the Expert verified by Institute of History, Archaeology, and Ethnology of the Academy of Sciences of Kyrgyz Republic – April 2025, additional studies in May 2025

4.3 Physical overview

4.3.1 Geographic overview

The city of Balykchy, of regional significance, has a permanent population of 42,875 people (including 42,380 in the city of Balykchy and 495 in the urban-type settlement of Orto-Tokoy). Further information about the settlements in the Project area is provided in section 4.5 below.

4.3.2 Climate

The Kyrgyz Republic lies within zones of moderately continental and sharply continental climates in the northern parts of the country and a subtropical climate in the south. According to the Köppen-Geiger classification, the country has 11 climatic regimes (Figure 49).

Due to the diversity of geomorphological conditions, Kyrgyz Republic is divided into four climatic regions: Northern and Northwestern (I), Northeastern (II), Southwestern (III), and Inner Tien Shan (IV). The Project area is situated within the Northwestern (I) (near Kemin SS), Northeastern (II) (Near Balykchy) and Inner Tien Shan (IV) (within the Boom gorge) regions (Figure 48). According to SNIP KR 23-02:2000, the general Study area belongs to subzone IIB and is classified as a dry zone in terms of humidity.

The nearest meteorological station, "Balykchy," is located on the northern outskirts of Balykchy city (absolute elevation 1657.8 meters) and provides observational data that can will be collected to support the ESIA.

I. Northern and Northwestern Kyrgyz Republic.

This region includes the Chui and Talas valleys and the surrounding mountain ranges, which are characterized by a moderately warm and sufficiently humid climate. Precipitation peaks in spring and early summer, with moderate winter precipitation influenced by the Siberian anticyclone. The latter half of summer in the lower zones is arid.

In the Northern and Northwestern climatic region, average January temperatures range from -5° to -10°C, while average July temperatures are +20° to +25°C. In the lowlands, absolute temperature extremes vary from -44°C to +46°C. The climate is classified as moderately warm and relatively humid. Precipitation increases from north to south, ranging from 370 mm to 500 mm, and reaches 1,000 mm or more on the slopes. The precipitation maximum occurs in April-May in the lower parts of the valleys and May-June in the mountains.

II. Northeastern Kyrgyz Republic.

This region includes the Issyk-Kul Basin. The area experiences peak precipitation in summer and minimal precipitation in winter, as low winter clouds forming below 3,000 meters are blocked by mountain ranges and rarely penetrate the Issyk-Kul Basin. The climate of the Northeastern region is influenced by the non-freezing Issyk-Kul Lake and features maritime characteristics with mild winters, relatively warm summers, and smooth temperature transitions between seasons. The average January temperature ranges from -3° to -7°C, while in July, it ranges from +17° to +23°C. In the lower parts of the basin, temperatures vary between -27°C and +34°C.

Moisture conditions change from west (dry) to east (almost temperate humid). Annual precipitation is 100–120 mm in the west, 250–300 mm in the central basin, and up to 400 mm in the east. The maximum precipitation occurs in July-August, and the minimum in January-February.

Two stormy winds are prominent in the basin: "Ulan" in the west and "Santash" in the east. The "Ulan" wind is particularly strong, reaching speeds of 25–30 m/s.

- Inner Tien Shan

The Inner Tien Shan is characterized by the coldest and least humid climate, distinguished by low evaporation rates at relatively low temperatures. In the high-altitude zone, where precipitation exceeds evaporation, glaciers and snowfields cover significant areas. The annual precipitation pattern is with the peak occurring in May, June, and July.

The Inner Tien Shan is the coldest region, with temperatures in the lowlands ranging from -3° to -5°C in January and +20° to +25°C in July. Extreme temperatures fluctuate between -50°C and +37°C[24].

In the Chui region, westerly winds prevail, while in Issyk-Kul, wind conditions are shaped by local circulations. During the day, breezes often blow from the lake to the land, and at night, the pattern reverses. The frequency of strong winds in the Issyk-Kul Basin is significantly higher than in the rest of the country. On average, the central and eastern parts experience 20–50 days of strong winds per year, while the western basin sees over 70, with some years recording up to 120 days. Along the lake, the predominant wind is the westerly “Ulan”, while the eastern part experiences the easterly “Santash”. When these winds occur simultaneously, they can form typhoon.

Precipitation in the zone varies as one moves from west (up to the Boom Gorge) to east (toward the city of Balykchy). In the plains of the Chui region, the average annual precipitation is 400–500 mm. In the northwestern part of the Boom Gorge, it decreases to 300–400 mm, dropping further to 200–300

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mm in the southeastern part of the gorge, and finally reaching 100–200 mm on the eastern shore of Issyk-Kul.

According to the Köppen-Geiger classification, the project route lies in the BSk zone (B – arid, S – steppe, k – cold), with the extreme eastern part of the route falling into the BWk zone (B – arid, W – desert, k – cold).

Figure 48: Climatic Regions of Kyrgyz Republic[25]

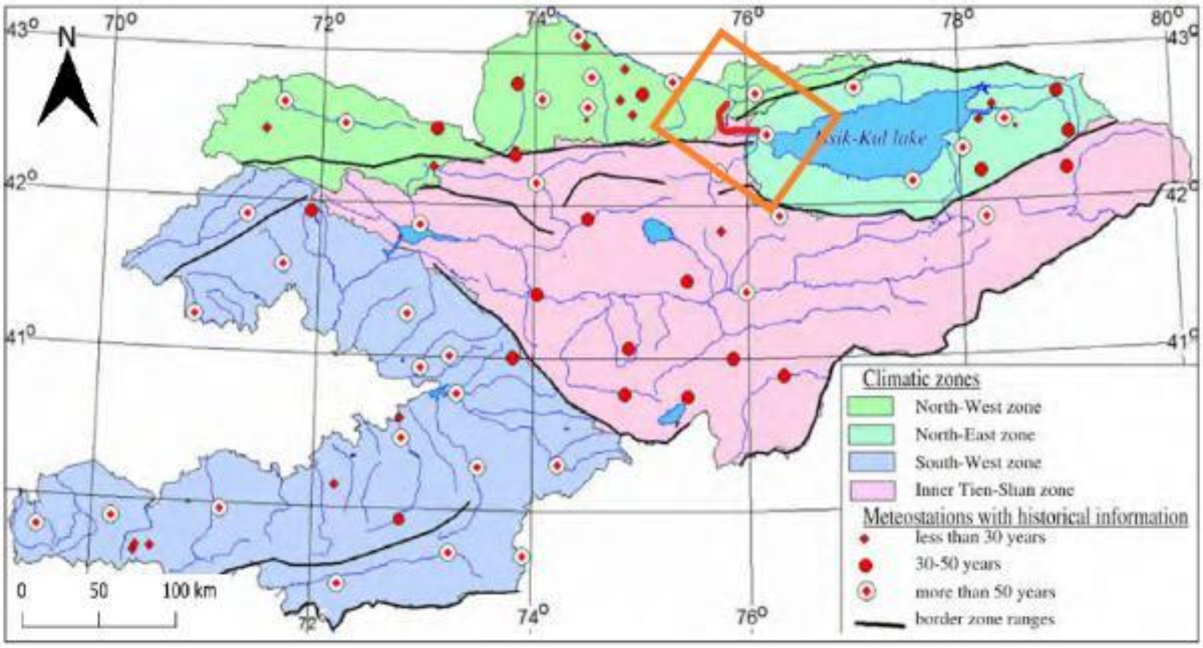
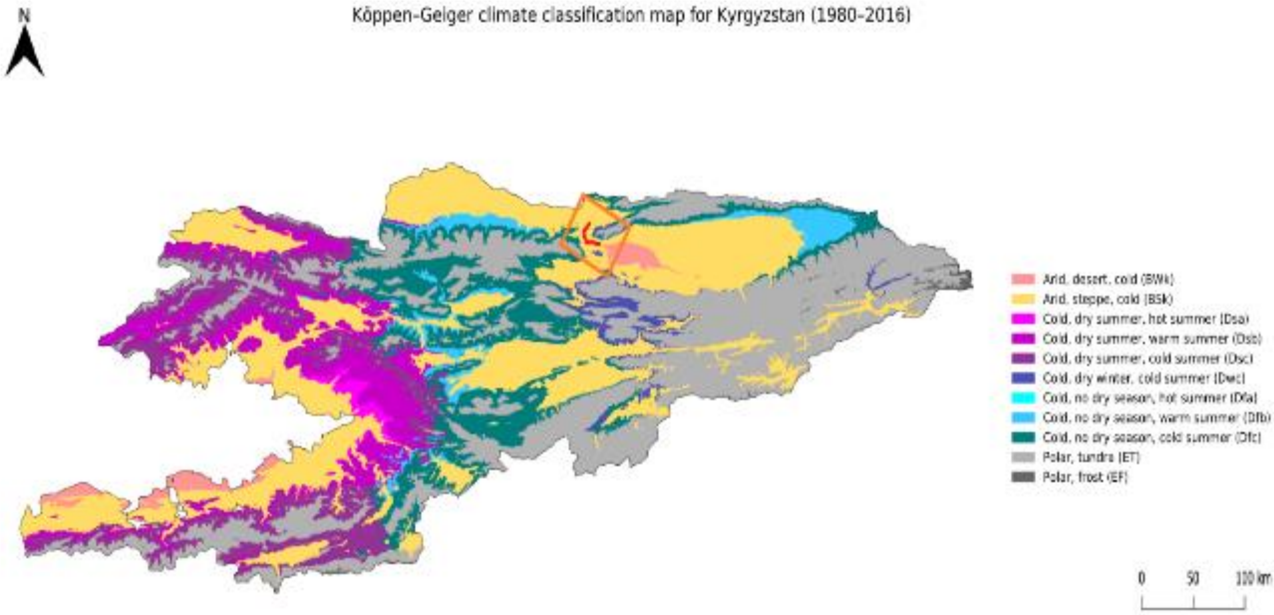


Figure 49: Kyrgyz Republic Climate Map by Köppen-Geiger[26]



25 Climate Profile of the Kyrgyz Republic – Ilyasov Sh., Zabenko O., Gaidamak N., Kirilenko A., Myrsaliev N., Shevchenko V., Penkina L. – Bishkek, 2013 – 99 pages.

26 Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018)

4.3.3 Climate projections

Climate models consistently predict warming across the entire territory of Kyrgyz Republic during the 21st century. Under the climate change scenario with the highest greenhouse gas emissions (RCP 8.5), the temperature increase in the country is projected to exceed global averages, reaching a rise of 5.3°C by 2090[27]. This scenario also predicts a significant increase in the number of days with temperatures exceeding 40°C in the plains. Currently, such temperatures are atypical and extreme for the country's population[28]. The most climate-vulnerable sectors are:

- Water resources;
- Hydropower;
- Emergency response;
- Agriculture;
- Public health;
- Forest resources and biodiversity.

According to the Climate Risk Profile of the Kyrgyz Republic[29] and the Climate Profile of the Republic[30], the country may face the following risks as a result of warming:

- By 2090, the average temperature could increase by up to 5.3°C above baseline levels, with extreme temperatures in lowland areas (regularly exceeding 40°C)
- Increased intensity of droughts (occurring every 15 years)
- Reduction in snow cover and glacier degradation (glacier runoff is expected to peak around 2040), leading to a risk of water shortages after depletion
- Seasonal shifts
- Decrease in overall precipitation levels and changes in its seasonal distribution
- Increased risk of floods and landslides
- Deterioration in water resource quality
- Reduction in alpine ecosystem areas
- Elevated threats to forest ecosystems (including increased fire frequency)
- Decline in soil fertility.

4.3.4 Topography

The Kyrgyz Republic is geographically located in the Northern Hemisphere, in the northeastern part of Central Asia, occupying a section of the Pamir-Alay mountain range. It is bordered by the Kyrgyz Ala-Too mountain range, the Chu River to the north, and the Kakshaal-Too and Alay mountain ranges to the south. Kyrgyz Republic is a landlocked country in Central Asia, bordered by Kazakhstan to the

27 Asian Development Bank, World Bank. Climate Risk Country Profile: Kyrgyz Republic (2021) (Source: https://www.adb.org/publications/climate-risk-country-profile-kyrgyz-republic?utm_source=chatgpt.com).
28 https://pk.kg/news/inner/bolshe-zharkih-dnej-tayanie-lednikov-i-zasuhi-to-chto-vlechet-izmeneniya-klimata-v-kyrgyzstane/
29 Asian Development Bank, World Bank. Climate Risk Country Profile: Kyrgyz Republic (2021) (Source: https://www.adb.org/publications/climate-risk-country-profile-kyrgyz-republic?utm_source=chatgpt.com).
30 Climate Profile of the Kyrgyz Republic – Ilyasov Sh., Zabenko O., Gaidamak N., Kirilenko A., Myrsaliev N., Shevchenko V., Penkina L. – Bishkek, 2013 – 99 pages.

north, Uzbekistan to the west and northwest, Tajikistan to the southwest, and China to the south and southeast. Mountains cover 94% of the country.

The total area of the country is 199,900 km². Its territory stretches 925 km from east to west and 454 km from north to south. The landscapes of Kyrgyz Republic are shaped by the country's continental distance from seas and oceans, its rugged terrain, and high altitude: 94.2% of the territory lies above 1,000 meters, 40.8% above 3,000 meters, with an average elevation of 2,750 meters above sea level. These and other factors contribute to the diversity of natural conditions. The Kyrgyz Republic features all-natural zones typical of the Northern Hemisphere, except tropical zones. The complex mountainous terrain and various ecological conditions have resulted in a rich diversity of soil, vegetation, and wildlife. The country's landscapes include deserts, steppes, meadows, forests, shrub thickets, wetlands, alpine tundra, and other vegetation types.

The proposed OHTL ROW routes through altitudes ranging from 1,500 to 2,000+ meters above sea level. The topography plays a significant role in shaping the landscapes and natural conditions. The topography of the area is shown in Figure 50, and the elevation profile along the OHTL route is depicted in Figure 51.

Figure 50: Topography map of the project route (Source: https://www.maps-of-the-world.org/maps/asia/Kyrgyz Republic/large-scale-physical-map-of-Kyrgyz Republic-with-other-marks.jpg)

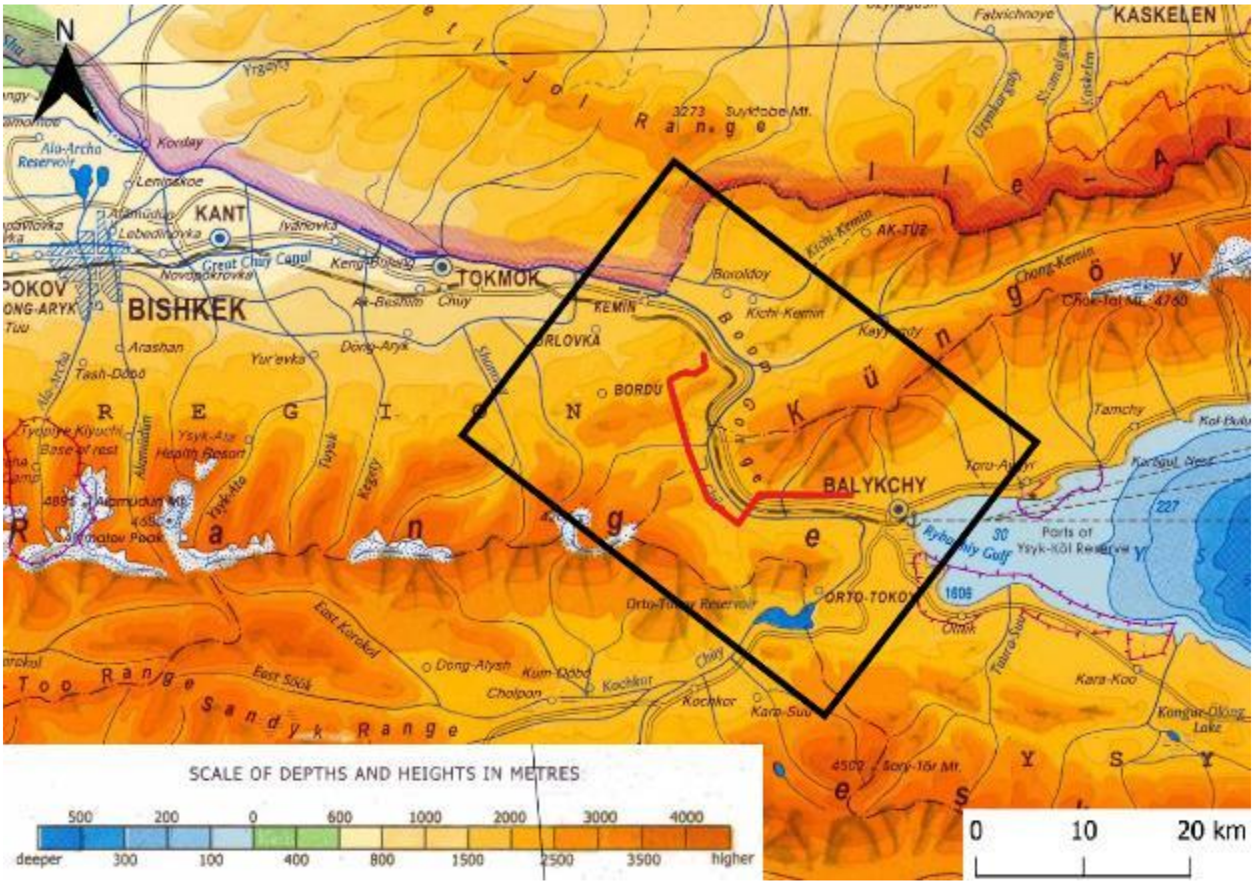
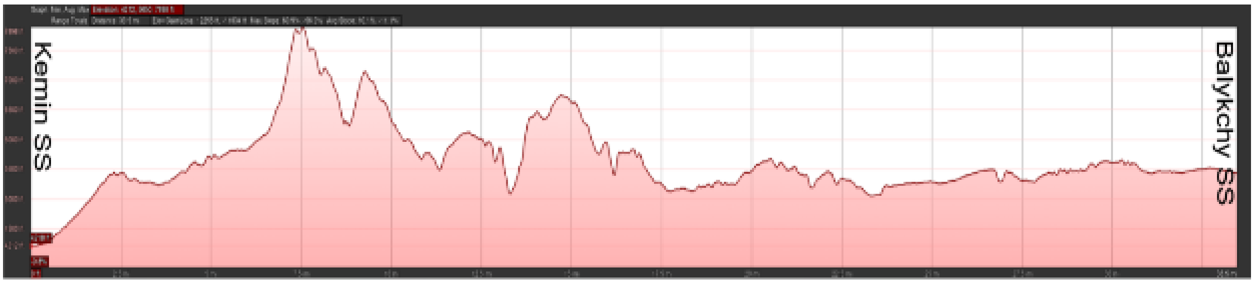


Figure 51: Elevation profile of project route (Source: Google earth)



4.3.5 Geology and seismicity

The Kyrgyz Republic is located in a region with high seismic activity, making earthquake risks significant. Earthquakes with a magnitude of 5 or higher occur on average once a month, while those with a magnitude of 7 or higher happen every few decades. The most vulnerable zones include the cities of Osh, Jalal-Abad, Bishkek, and their surrounding areas[31].

Kyrgyz Republic encompasses a large portion of the Tien Shan and the northern regions of the Pamirs. The Tien Shan is bordered to the north and west by the Kazakh Shield and Turan Plate, and to the south by the Tarim Platform. It experiences intense submeridional compression, which is one of the primary causes of frequent earthquakes. The two main seismic zones—the Northern Tien Shan and Southern Tien Shan—are located in the northern and southern border areas of the republic, where strong earthquakes have historically occurred.

The southwestern part of the Tien Shan is particularly seismically active, with more than 2,000 earthquakes recorded annually. In contrast, the northeastern part of the Tien Shan has significantly lower seismic activity, although some very strong earthquakes have been documented in the past. On average, 3,000 earthquakes are recorded annually across the country[32]. The seismic activity in Kyrgyz Republic and the earthquake epicenters are shown in Figure 52 and Figure 53 respectively.

31 Measuring Seismic Risk in Kyrgyz Republic: Seismic Risk Reduction Strategy. World Bank. 2017
32 A.G. Frolova, K.D. Dzhanuzakov, E.V. Pershina, R. Shukurova. Seismicity of the Kyrgyzstan Territory. Izvestiya of the National Academy of Sciences of the Kyrgyz Republic, 2012, No. 3.

Figure 52: Seismic maps (Source: Measuring Risk in Kyrgyz Republic, Seismic Hazard Assessment Report, World Bank, 2017)

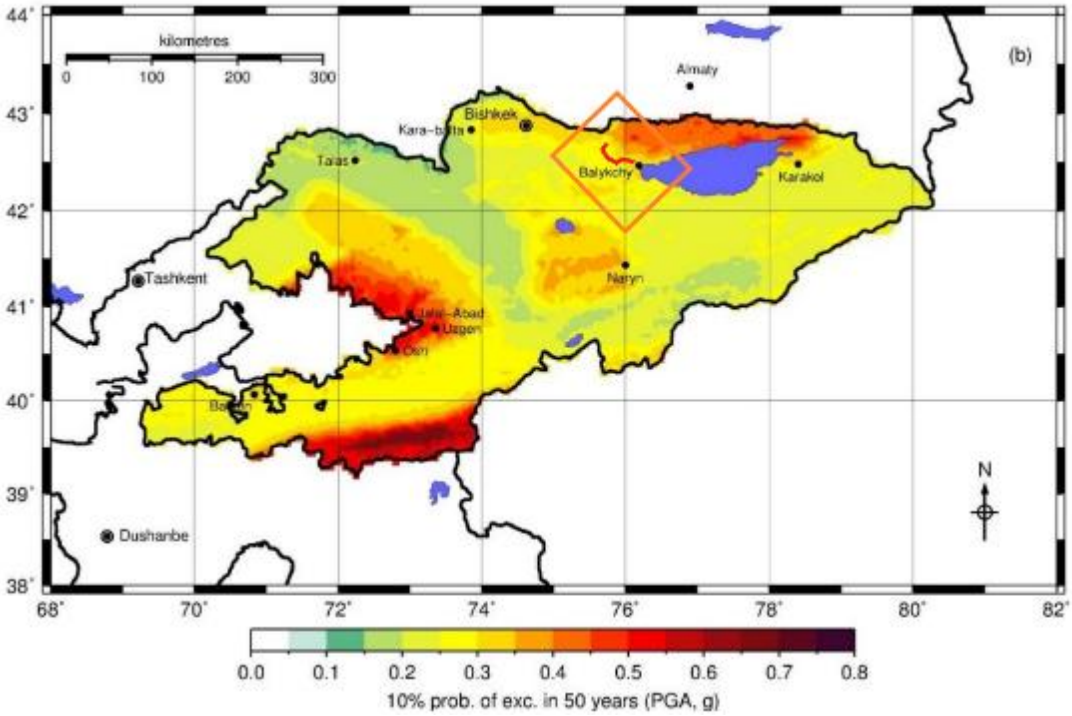
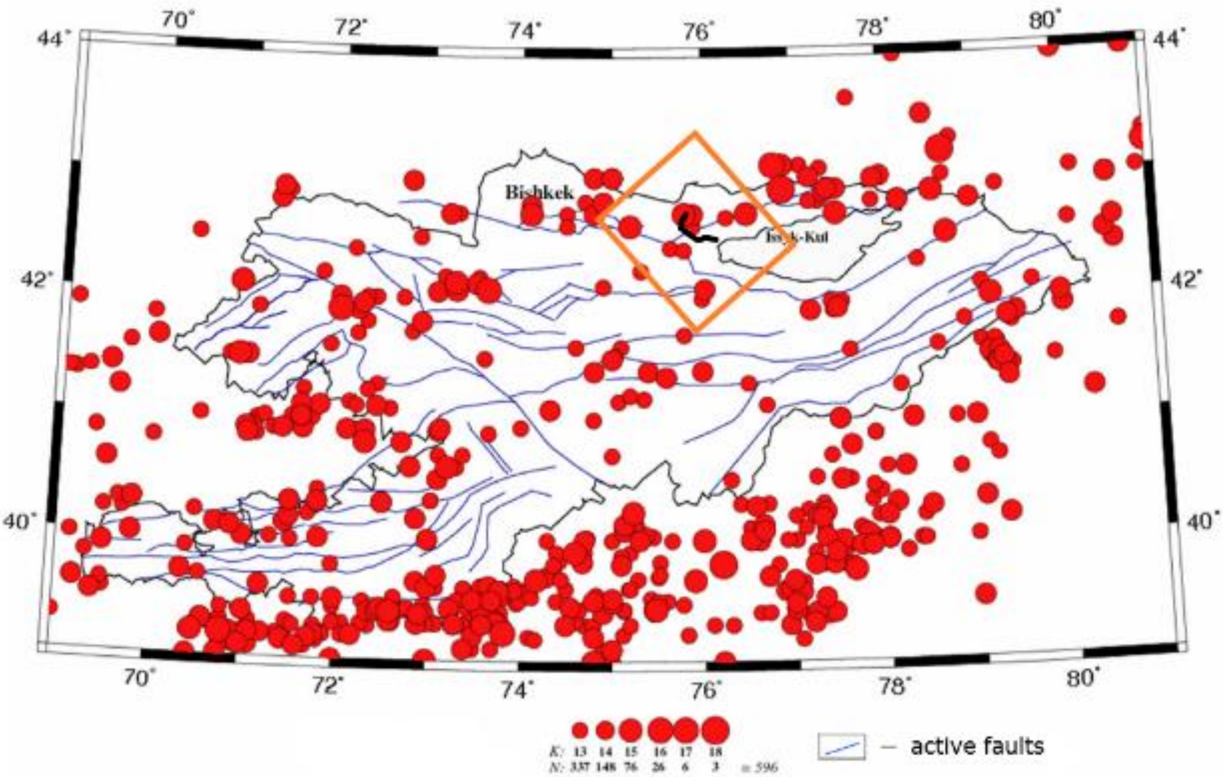


*Figure 53: Earthquake centres (Source: A.G. Frolova et al. Seismicity of the Kyrgyz Republic Territory. *Izvestiya of the National Academy of Sciences of the Kyrgyz Republic*, 2012, No. 3)*



4.3.6 Soils[33]

The complex topography of Kyrgyz Republic results in diverse soil coverage[34]. According to the monograph Soils of the Kyrgyz SSR[35], 11 main soil types are identified in the country:

- Serozems
- Gray-brown desert-steppe stony soils
- Light-brown soils
- Chestnut soils
- Chernozems
- High-mountain soils
- Mountain slope soils
- Mountain forest soils
- Alpine belt soils
- Subalpine belt soils
- High-mountain barren soils

The general characteristics of the country's soils include low thickness (ranging from 0.2–0.5 m on mountain slopes to 1.5–3 m in plains and intermontane basins), medium to heavy loam texture, high carbonate content, and increased alkalinity. These properties impact agricultural use, such as fertilizer application rates and irrigation practices. The main soil issues in Kyrgyz Republic are erosion and salinization.

According to the land cadaster of Kyrgyz Republic, 5 million hectares, or 45.7% of agricultural land, are affected by erosion[36]. Factors influencing soil erosion include the morphogenetic structure of the soil, physical-chemical properties, slope gradient, vegetation cover, and erosion type.

For arable irrigated soils, slopes of 3-4° are considered highly eroded, while steeper slopes are categorized as severely eroded. For pasture soils, erosion becomes significant at slopes of 25-35° and severe at 35-40°. The main types of erosion in Kyrgyz Republic are water, pasture, and wind erosion. Measures to combat erosion include maintaining high vegetative cover (90%) with climax vegetation, plowing along slopes, developing proper irrigation systems, and preventing overgrazing[37][38].

Soils in the Study area According to the Soil Map of the USSR (Figure 54), are within the zones of **brown desert-steppe soils** and **mountain chestnut soils**.

33 Due to the large body of data accumulated under the Soviet classification, this chapter discusses the USSR Soil Classification System33 alongside the international World Reference Base for Soil Resources (WRB) classification
34 World Reference Base for Soil Resources.IUSS Working Group WRB. 2022.
35 Mamytov A.M. Soils of the Kyrgyz SSR. 1974.
36 Collection of Articles from the Scientific and Academic Community of Kyrgyzstan: "Explore". 2023.
37 Mamytov A.M. Soils of the Kyrgyz SSR. 1974.
38 K.K. Kenjahimov, Temirbek иилu Ilichbek. ECOLOGICAL PROBLEMS OF SOIL EROSION IN KYRGYZSTAN. ИЗВЕСТИЯ ВУЗОВ № 1, 2010.

Figure 54: Location of the OHTL route relative to soil cover (Source: Atlas of the USSR Soil Map / Main Directorate of Geodesy and Cartography under the Council of Ministers of the USSR. Moscow. 1983. pp. 104–105)

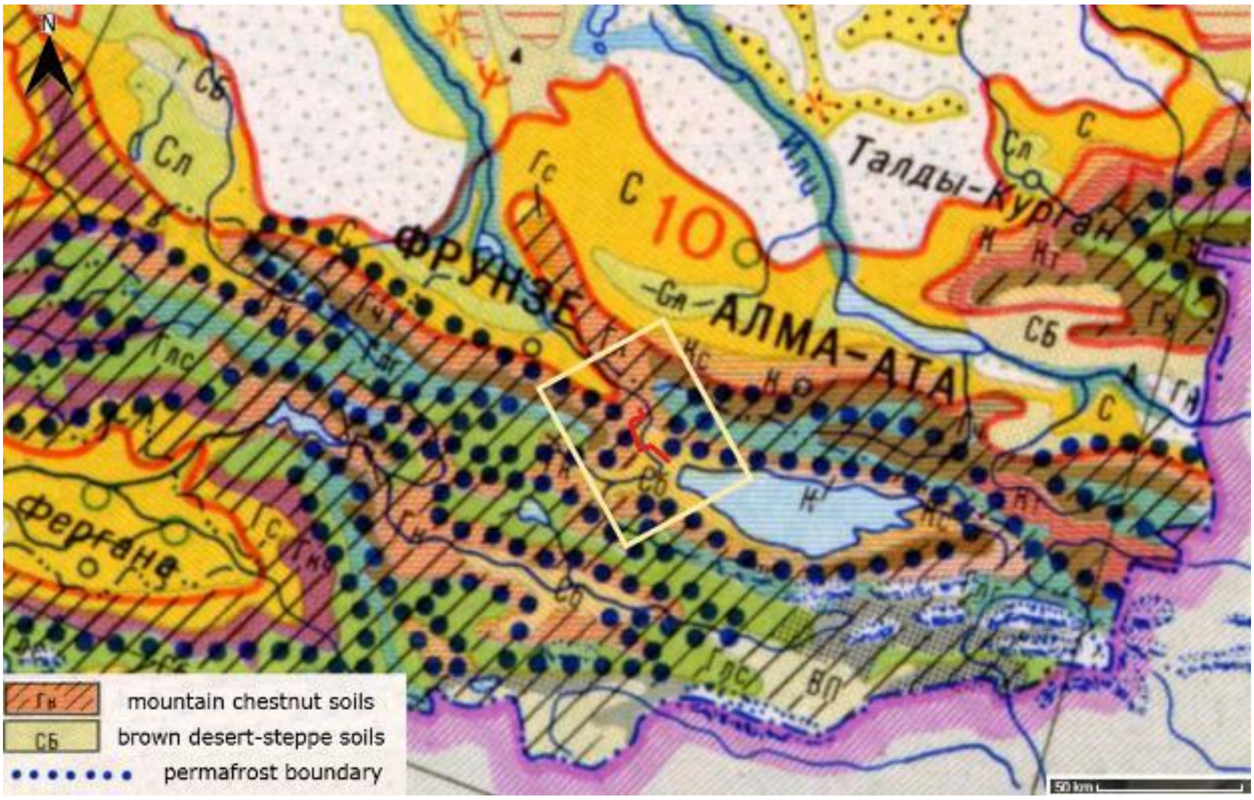


Figure 55: Brown Desert-Steppe Soils

Found in western Issyk-Kul at altitudes of 1,620-1,820 m, **b**rown desert-steppe soils are associated with stony deserts of foothill plains. Strong winds (15-20 m/s), prevalent year-round, influence their formation, leading to wind erosion. Vegetation is sparse, consisting of saltbush-shrub communities with 15-20% ground cover. The soil profile is uniform, with a thin (1-3 cm) loose light-gray crust on top and widespread stoniness. The texture ranges from light to heavy loam, with low humus content (1-2%), carbonate content of 5-10%, and pH values of 8.2-8.8. These soils are saline and sodic, with poor microflora[39][40]. Due to low cation exchange capacity and microbial activity, these soils are highly vulnerable to chemical pollution, while their low vegetative cover and wind erosion result in poor physical stability.

Figure 56: Mountain Chestnut Soils

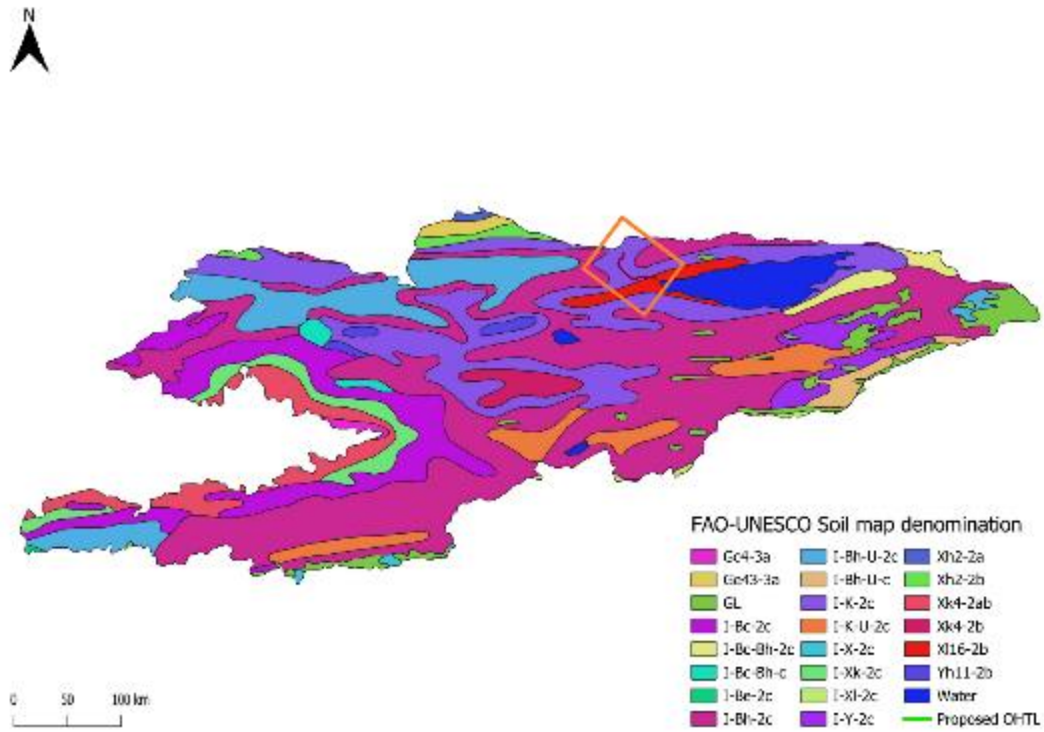
Mountain chestnut soils are widespread in Kyrgyz Republic, found on low mountain slopes of varying erosion levels and dissected by watercourses. Carbonate-rich parent materials are present at shallow

39 Mamytov A.M. Soils of the Kyrgyz SSR. 1974.
40 Soil science. Part 2: Types of soils, their geography and use. Moscow, 1988.

depths, resulting in low humus content. Vegetation is sparse and primarily consists of short-grass steppe species (feather grass, fescue) and dwarf shrubs. They are further divided into light chestnut and dark chestnut soils. **Light chestnut soils** have a gray-brown humus horizon, poorly differentiated soil profiles, and a weak crumbly structure. Their texture is light to medium loam, with humus content of 2.5-3.5%, carbonate presence from the surface, pH of 8.6-9.0, and cation exchange capacity of 15-20 meq per 100 g. **Dark chestnut soils** have a darker humus horizon, lower carbonate content, and no effervescence from the surface. Humus content is 4.5-6.5%, pH is 7.6-8.5, and cation exchange capacity is 28-32 meq per 100 g[41][42]. Both soil subtypes share vulnerabilities to erosion and chemical pollution, but dark chestnut soils are more resistant to contamination, though their absolute resistance is low. Due to their location on slopes, these soils are especially erosion-prone.

The FAO-UNESCO Soil Map[43], which served as a basis for the WRB classification, includes information on dominant and associated soils, their texture, and the relief forms where they occur. The Study area, based on this map (Figure 57), falls within the XI16-2b zone in Issyk-Kul and I-K-2c in Boom Gorge and the Chui region.

Figure 57: Soil Map (FAO-UNESCO) (Source: https://data.apps.fao.org/map/catalog/srv/eng/catalog.search#/metadata/cc45a270-88fd-11da-a88f-000d939bc5d8)



XI16-2b means the following:
XI-16: Xeric Luvisols
2: Medium texture
b: Slopes of 8-30%

41 Mamytov A.M. Soils of the Kyrgyz SSR. 1974.
42 Soil science. Part 2: Types of soils, their geography and use. Moscow, 1988.
43 FAO-Unesco Soil. Volume VIII:North and Central Asia. 1978.

Xerosols are soils that have an argillic B horizon, and they may also feature a calcic or gypsic horizon beneath the argillic horizon. The argillic horizon is a soil layer formed by clay accumulation. In the current WRB classification, Xerosols have been reclassified as Calcisols or Gypsisols, depending on whether they contain a calcic or gypsic horizon I-K-2c means the following:

- I-K: Lithosols dominate, associated with chestnut soils
- 2: Medium texture
- c: Slopes exceeding 30%

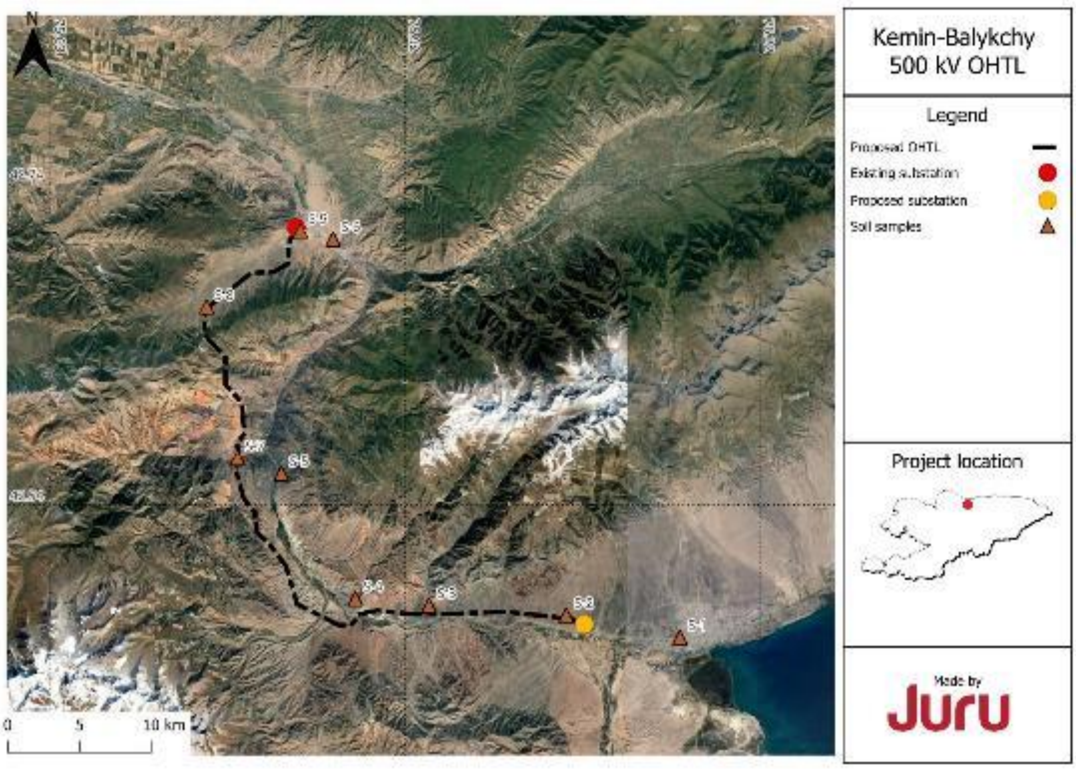
Lithosols are soils with a soil layer up to 10 cm thick underlain by bedrock. In the WRB classification, this group of soils has been revised and is now referred to as Leptosols. Leptosols can have a depth of up to 25 cm, with variants characterized by a thin soil layer of up to 10 cm, forming on calcium-rich parent materials and containing a large amount of rocky material in the profile.

Chestnut soils are characterized by a mollic horizon, and they may also have calcic or gypsic horizons, potentially lacking a natric horizon, salinity indicators, and signs of hydromorphism. The mollic horizon has a strong structure, a base saturation of over 50%, and organic matter content of 1–4%. Chestnut soils have been incorporated into the WRB classification.

4.4.2.4. Soil sampling

Samples were taken at 9 locations where the intended sampling of soil and water was determined (Figure 58).

Figure 58: Soil sampling locations



Soil samples were taken from 20 cm in accordance with the established State standard 17.4.4.02-2017 "*Nature protection. Soils. Methods for sampling and preparation of soil for chemical, bacteriological, helminthological analysis*". For sample collection, five points were determined using the envelope method. Whenever possible, a distance of approximately 100 meters was maintained between the outermost points to ensure representative sampling. At each point, a pit was dug to collect 500 grams of soil, after which all collected soil was thoroughly mixed. Using the quartering method, a portion of the sample was returned to the pits. As a result, the composite sample weighed approximately 800 to 1000 grams.

4.4.2.5. Soil analyses results

Soil sampling performed at the project site indicates alignment with the general soil characteristics and structure for the area and does not indicate any major sources of contamination or naturally elevated concentrations of metals[44]. The analyzed parameters are presented in Table 23 below.

Table 23: Soil analysis parameters

Nature component	Parameters
Soil	pH
	Gross content (Zn, Cr, Cd, Cu, Mn, Hg, Ni, Fe, Pb, Na, K)
	NO^{3-}

Soil sampling confirmed that the soils belong to Brown Desert-Steppe Soils/Xerosols in the eastern part of the project, and to Mountain Chestnut/Chestnut types within the Boom Gorge and mountain meadows of the project area in the western part.

The soils have a weakly developed and poorly differentiated profile with high stoniness, reaching a depth of about 20–40 cm, an alkaline pH (around 8), and heavy metal concentrations close to the upper limits established by national regulations. All analysed samples, except for one, show no signs of agricultural use or significant accumulation of organic matter. The most fertile sample was taken from the right bank of the Chu River in the Kemin District - its profile coloration indicates a relatively high organic matter content, and the soil at the sampling location had the most developed profile. The lands within the Boom Gorge in the route area are considerably polluted due to significant anthropogenic transformation of the area. One sample from the central part of the gorge near EM11 highway had the highest heavy metal concentrations and the least developed soil profile. At the same time, soil samples taken in the mountainous plains along the OHTL route comply with established standards for both heavy metals and nitrates - these areas can be used as pastures. Compared to the

44 Volume III, Environmental Baseline report, Juru 2025.

other samples, the dark brown coloration of the profile allows them to be identified as moderately fertile, but due to the terrain, they may be prone to erosion if the vegetation cover is removed[45].

4.4.2.6. Standards and Maximum Permissible Concentrations (MPC) for soil

Table 24 shows the standard values for soil based on local and international regulations.

Table 24: Applicable soil quality standards.

Name of parameters	**National TPC/MPC[46] in mg/kg**	**Dutch intervention Value / Target Value[47][1]**	
pH	-	-	-
Zinc (Zn), mg/kg	55.0[48] / 220.0[49] (gross content)	7200	140
Chromium (Cr), mg/kg	6.0 (mobile)	180	-
Cadmium (Cd), mg/kg	0.5 / 2.0 (gross content)	13	0.8
Copper (Cu), mg/kg	33.0 / 132.0 (gross content)	190	36
Manganese (Mn), mg/kg	60.0 / 700.0 (mobile)	-	-
Mercury (Hg), mg/kg	2.1 (gross content)	36	0.3
Nickel (Ni), mg/kg	20.0 / 80.0 (gross content)	100	35
Iron (Fe), mg/kg	-	-	-
Lead (Pb), mg/kg	32.0 – 130.0 (gross content)	530	85
Sodium (Na), mg/kg	-	-	-
Potassium (K), mg/kg	-	-	-
Nitrate (NO^{3-})	130	-	-

4.3.7 Air quality

Air quality in Kyrgyz Republic is determined by both economic activity and natural conditions. The rugged terrain, the presence of intermontane basins, and the continental climate hinder the movement of air masses, which often results in the absence of horizontal air movement in urban

45 Appendix 2 provides an extended analysis of the metals, for soil and water samples.

46 Maximum Permissible Concentration – MPC. The Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Hygienic standards "Maximum Permissible Concentrations and Tentatively Permissible Quantities of Chemical Substances in Soil" according to Appendix 21) - **The studied soils are not of a specific land use type; therefore, TPC was used as a reference when available, and MPC was applied in the absence of an alternative.**

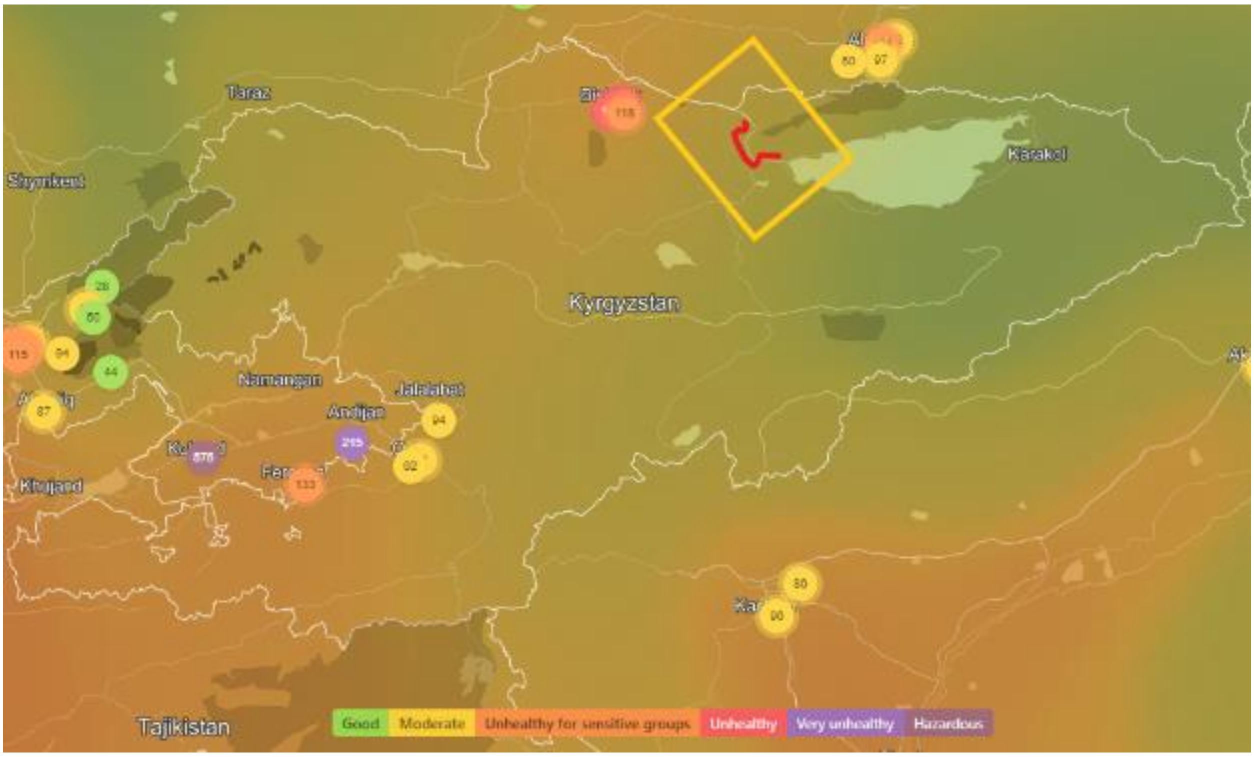
47 Dutch Standards for Soil and groundwater Contamination (2013).

48 Sandy or sandy loam soil

49 Loamy and clayey soils

areas. As a result, the annual average concentrations of almost all detectable impurities in cities exceed actual emissions. In non-industrial areas of the country such as the Study area, air pollution decreases. For example, studies of aerosol air pollution in the Issyk-Kul region showed satisfactory levels[50].

Figure 59: Air quality in Kyrgyz Republic (Source: IQair)



An AQ survey was performed along the OHTL ROW to confirm the AQ in the project AOI for the purpose of benchmarking against construction air quality in the future [51]. All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.5 dBA. Sound meter fitted with a protective windshield for the entire measurements period.

The outcomes of the baseline survey work indicate that air quality in the project AOI may be slightly degraded with high concentrations of nitrogen dioxide (NO_2) and particulate matter ($PM_{2.5}$ and PM_{10}) in the part of the project where it follows the EM11 highway, including the area of the planned Balykchy substation. In the mountainous sections of the line, air quality improved - $PM_{2.5}$ and PM_{10} concentrations were within normal limits and did not exceed the most stringent international reference values[52]. However, NO_2 concentrations remained at the same elevated levels as those observed in the road area. Despite the high values and exceedance of WHO standards, the

50 T.D. Sargazakov, Sh. Jusupkeldiev. MEASUREMENTS OF SURFACE AEROSOL CONCENTRATIONS OF ISSYK-KUL BASIN, THEIR MICROSTRUCTURE AND SOME MICROPHYSICAL CHARACTERISTICS. Bulletin of KRSU. 2017. Volume 17. No. 12. pp. 190–194.
51 Volume III – Environmental Baseline Report – Air Quality, Juru, 2025.
52 The WHO Ambient Air Quality Guidelines

concentrations are at the upper limit of permissible levels or only slightly exceed them according to national standards[53].

4.3.8 Noise

The Project ROW runs near the EM-11 highway at its eastern part, which has relatively active traffic, and the Bishkek-Balykchy railway, primarily used for freight transport; and in mountainous areas at western part. Based on current observation and consultation with relevant authorities, railway traffic is minimal. During the tourist season, this railway is also used for passenger trains. Transport infrastructure is considered as the main source of noise in the area. A noise baseline survey was performed along the OHTL ROW for the purpose of benchmarking against construction noise levels in the future. Monitoring was performed at nearest sensitive receptors (NSRs) along the ROW including settlements, farms, local points of interest (scenic canyons), and the NABU wildlife rehabilitation center. The results confirm that noise levels in the project AOI are moderate. The highest noise levels are associated with the EM11 highway - at locations along the roadside villages, noise levels fluctuate slightly throughout the day, remaining within the range of 43-48 dB, with a slight decrease at night. At the nearest houses to the EM11, located near the main boundary of the village of Kok-Moynok-1, noise levels at night exceed the established standard by less than 1 dB. As the distance from the highway increases, noise levels goes down. At the Kok-Moynok-2 canyon, about 1 km away from the EM11, noise levels comply with the established standards. At the NABU wildlife rehabilitation center in the mountains, noise levels at any time of day do not exceed 40 dB. The main source of noise is the highway, making its level relatively constant. Thus, the daytime standard of 55 dB[54][55] is met, while nighttime levels are at the upper limit of the permissible 45 dB or slightly exceed it.

4.3.9 Geology and hydrogeology

Kyrgyz Republic includes the Central and almost the entire Western Tien Shan, with part of the Pamir-Alay located in its far southwestern region. One of the characteristic features of the geological structure of the Kyrgyz Republic is the presence of two major complexes forming its mountain rocks: pre-Mesozoic and Meso-Cenozoic. The first is represented by diverse sedimentary, magmatic, and metamorphic rocks, which are intensely deformed and have a very complex internal structure. The second complex consists of weakly deformed, unmetamorphosed, predominantly continental sedimentary terrigenous layers. The rocks of the lower complex form numerous ranges of the Tien Shan, while the Meso-Cenozoic sediments fill the intermontane basins. Only the Fergana and Zaalay ranges are primarily composed of rocks from the upper complex.

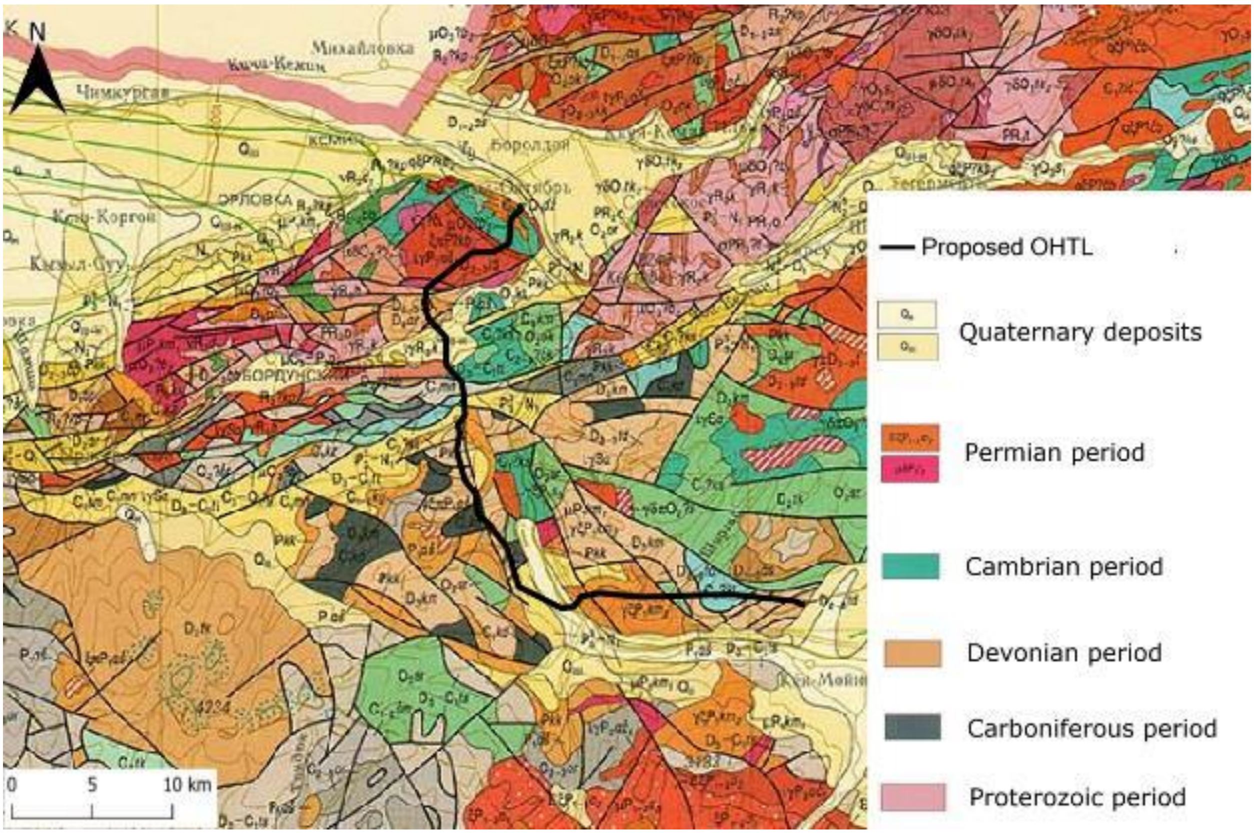
The Study area belongs to the Northern Tien Shan fold system, which includes Caledonides of the folded area prevalent in the northern mountain ranges of the Tien Shan and in the basement of

53 The Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Hygienic standards "Approximate Safe Levels of Pollutant Exposure in the Atmospheric Air of Populated Areas" according to Annex17)
54 The Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Sanitary Rules and Standards "Noise in Workplaces, Residential and Public Buildings, and Residential Areas" according to Annex14)
55 WBG Noise Level Guidelines

intermontane basins. These are distinguished by extensive development of sedimentary, metamorphic, and igneous rocks of pre-Paleozoic and early Paleozoic age. Middle and late Paleozoic deposits and intrusions are relatively less widespread[56].

According to the geological map of the Kyrgyz Republic[57], the project routes crosses territories with a complex composition, particularly in the Boom Gorge area (Figure 60). Near Balykchy, the OHTL passes through Quaternary deposits. In the mountainous area, the OHTL encounters Permian, Cambrian, Devonian, Carboniferous, and Proterozoic formations. Carboniferous deposits are represented to a lesser extent, and the northern section of the OHTL runs through a valley composed of Quaternary deposits. Near the substation, the deposits transition back to Quaternary layers.

Figure 60: The Project area in relation to the Geological Map of the Kyrgyz Republic (Source: State Agency for Geology and Mineral Resources under the Government of the Kyrgyz Republic, 2008)



4.3.10 Hydrogeology

Significant reserves of underground freshwater and mineral-thermal waters have been identified in Kyrgyz Republic. The primary resources of high-quality underground freshwater are concentrated in intermontane basins. A total of 44 deposits have been explored, of which 20 are intended for domestic, drinking, and industrial water supply, while the rest are used for irrigation. The potential reserves of the highest quality underground freshwater amount to approximately **13.6 km³**. Kyrgyz

56 Geology of the USSR. Volume 25. Kyrgyz SSR. Part 1. Geological Description. Book 1. 1972.
57 State Agency for Geology and Mineral Resources under the Government of the Kyrgyz Republic, 2008

Republic uses 20–25% of its available water resources, with the remaining flow passing to neighbouring countries: Kazakhstan, China, Tajikistan, and Uzbekistan.

The reduction of forest ecosystems and the increasing development of gold deposits along riverbeds and valleys negatively impact water resources and contribute to the formation of hydrological geohazards.

The main resources of high-quality underground freshwater are concentrated in intermontane basins. These basins vary in structure, which can include three levels: lower, middle, and upper.

- The **lower level** is formed by Paleozoic and Proterozoic rocks, with a predominantly fractured nature of water permeability.
- The **middle level** consists of Mesozoic-Cenozoic formations, including Neogene-lower Quaternary deposits, with porosity-fracture and fracture-based water permeability, and less commonly porosity-based. The underground waters in these levels are subject to restricted or highly restricted movement, primarily influenced by geological processes.
- The **upper level** is almost universally thicker and consists of Quaternary deposits of varying genesis and composition, with predominantly porous water permeability. The most productive aquifers are found in these layers. In the upper parts of the basins, underground water is formed through the infiltration of surface waters and partially through hidden drainage from surrounding mountain masses.

The OHTL ROW and substation lies within the zone of external intermontane artesian basins with three-level structures in parts of the route outside the gorge and in hydrogeological masses of varying structures within the Boom Gorge (Figure 61). The Issyk-Kul and Chui regions together hold **48% of all freshwater resources in the country**[58]. According to the well location map, several springs and existing wells are located near the Study area (Figure 62)

58 Groundwater of Kyrgyzstan: Issues of Use and Preservation. L.E. Orolbaeva. Mining Journal, 2016, No. 8, pp. 41–47.

Figure 61: Map of hydrogeological zoning. 1 - Hydrogeological masses; 2 - Intermontane external artesian basins with three-level structures; 3 - Intermontane internal basins with three-level structures; 4 - Intermontane internal basins with two-level structures; 5 - Slope basins. (Source: Groundwater of Kyrgyz Republic: Issues of Use and Preservation. L.E. Orolbaeva. Mining Journal, 2016. No. 8, pp. 41–47.)

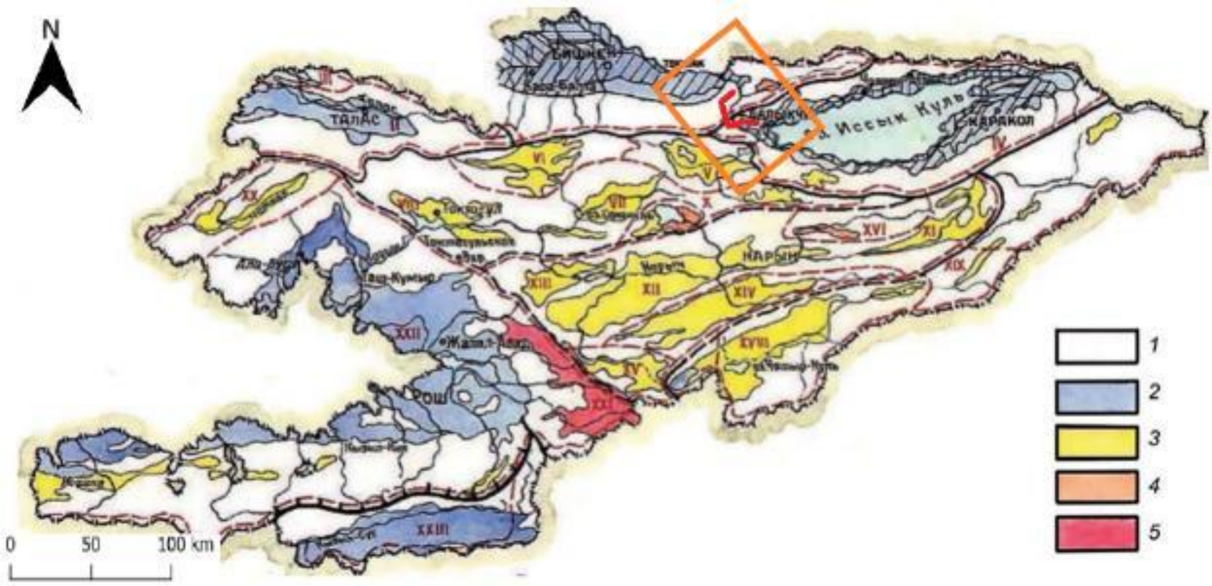
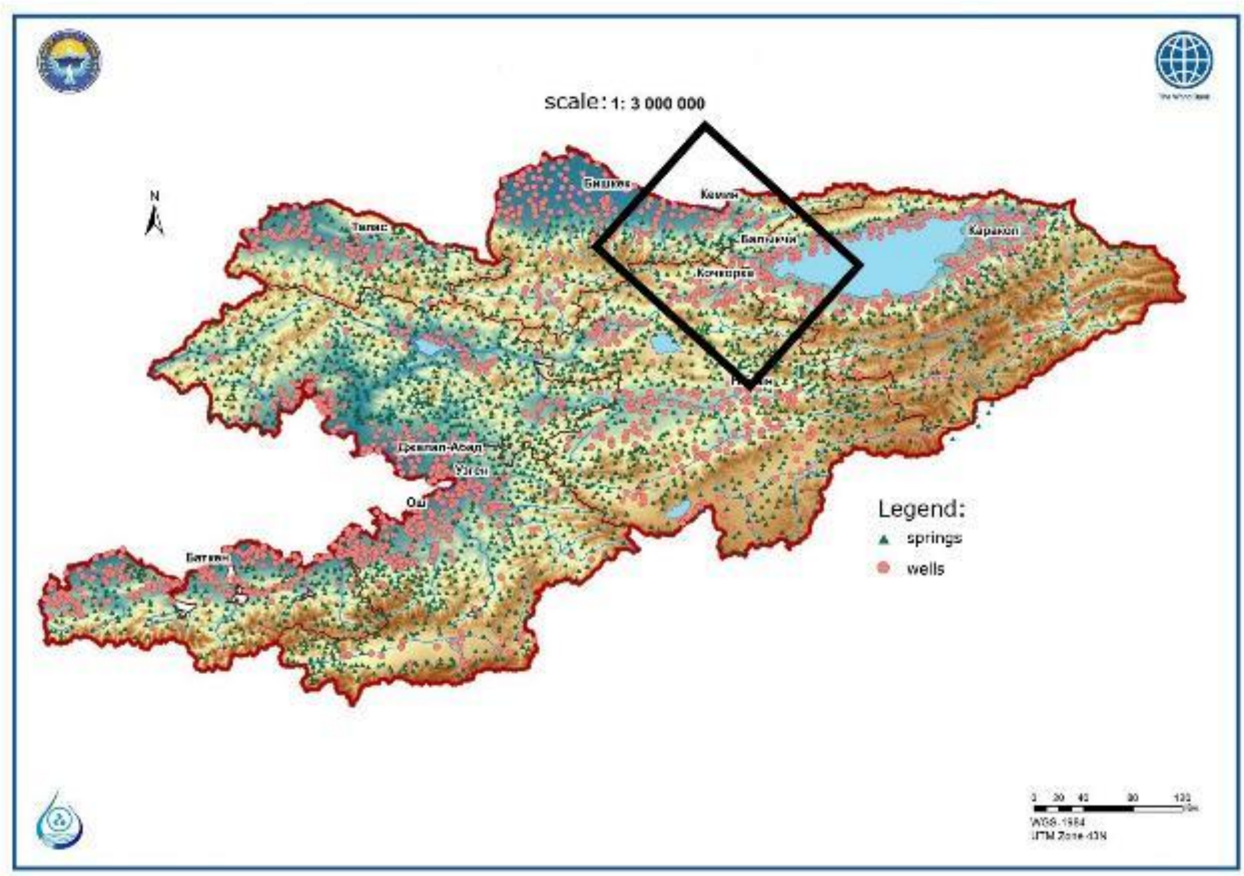


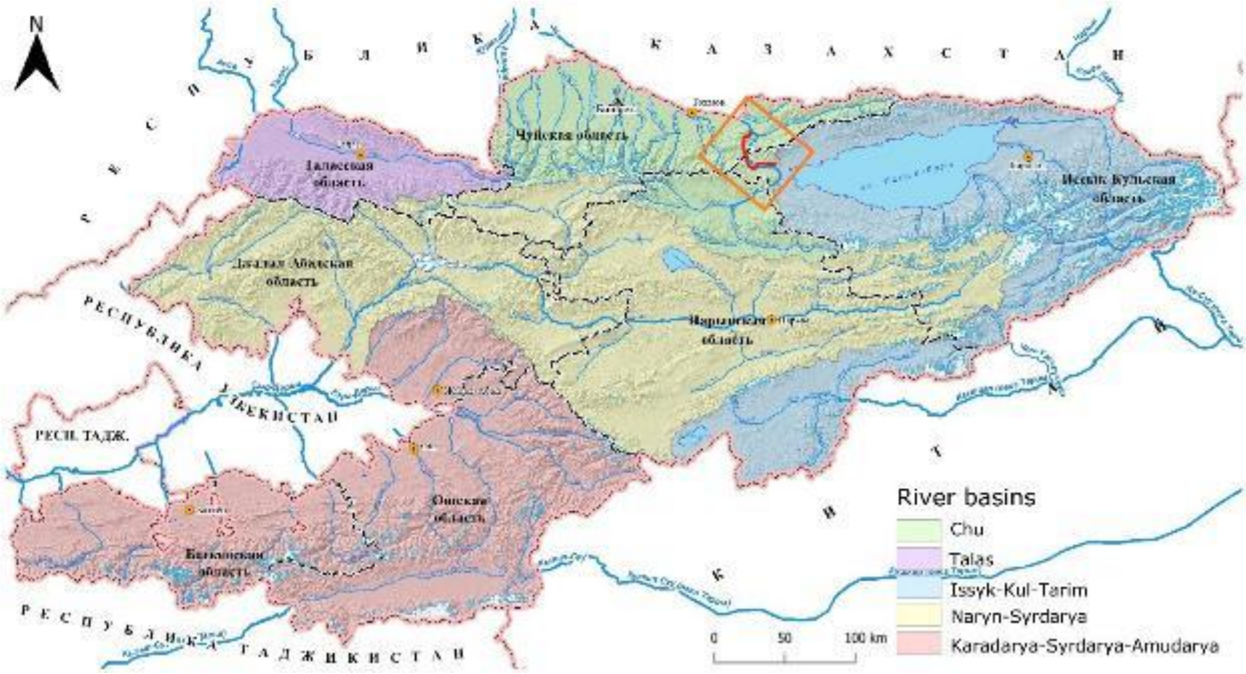
Figure 62: Locations of springs and wells in the Kyrgyz Republic (Source: Geological Map of the Kyrgyz Republic. State Agency for Geology and Mineral Resources of the Kyrgyz Republic, 2017)



4.3.11 Water resources

The Kyrgyz Republic possesses vast water resources, including seven major river basins (28,000 rivers and streams) and more than 2,000 lakes[59] with an estimated total water reserve of 2,458 cubic kilometres. This includes 650 cubic kilometres of water (26.4%) stored in glaciers, 1,745 cubic kilometres in lakes (71%), 13 cubic kilometres of potential underground water reserves (0.5%), and an average annual river runoff of 44.5 to 51.9 cubic kilometres (2%). Kyrgyz Republic's water resources are divided into six river basins: Talas, Naryn-Syr Darya, Karadarya-Syr Darya-Amu Darya, Issyk-Kul-Tarim, and Chu. The Study area is located entirely in the Issyk-Kul-Tarim and Chu basins (Figure 63).

Figure 63: Water basins of Kyrgyz Republic (Source: https://nwrmp.water.gov.kg/?page_id=1165&lang=ru_RU)



The Issyk-Kul and Chui basins account for 24% and 10% of the country's water resources, respectively. The river runoff in these regions is 289,000 and 251,000 cubic meters per square kilometre. Of this, 95% of the water is used for agriculture, with the Chui region being the leader in water abstraction (34% of all water withdrawn).

The brackish, endorheic Issyk-Kul Lake holds special significance for the country. The lake, of tectonic origin, was formed through faults, subsidence, and depressions in the Earth's surface. Key characteristics include:

- Area: 6,236 km²
- Length: 178 km
- Maximum width: 60 km
- Maximum depth: 668 m

59 Geography of the Kyrgyz Republic, Part 1. Physical Geography of the Kyrgyz Republic: Study Guide / Edited by Yu.V. Shinko. - Bishkek, KRSU Publishing House, 2021. - 242 pages

- Average depth: 278 m
- Volume: 1,738 km^3

Over 50 rivers flow into Issyk-Kul, with a total annual runoff exceeding 3 km^3. The lake's pH ranges from 7.95 to 8.82, and salinity is 6.22 g/L. Its waters are uniform in terms of salinity, specific weight, and chemical composition due to its depth[60]. Near Balykchy and southward along the lake's shore, several canals likely discharge brackish water after irrigation.

The OHTL ROW crosses the Chu River upstream of the village of Kok-Moynok-2, after which it turns southeast into the mountains. The route crosses two right tributaries of the Chu River and several seasonal streams within the gorges. Upstream from the Kok-Moynok-1 village, two water intake canals also originate:

- The left canal diverts water to agricultural fields=.
- The right canal directs water toward wastewater treatment facilities near the riverbank.

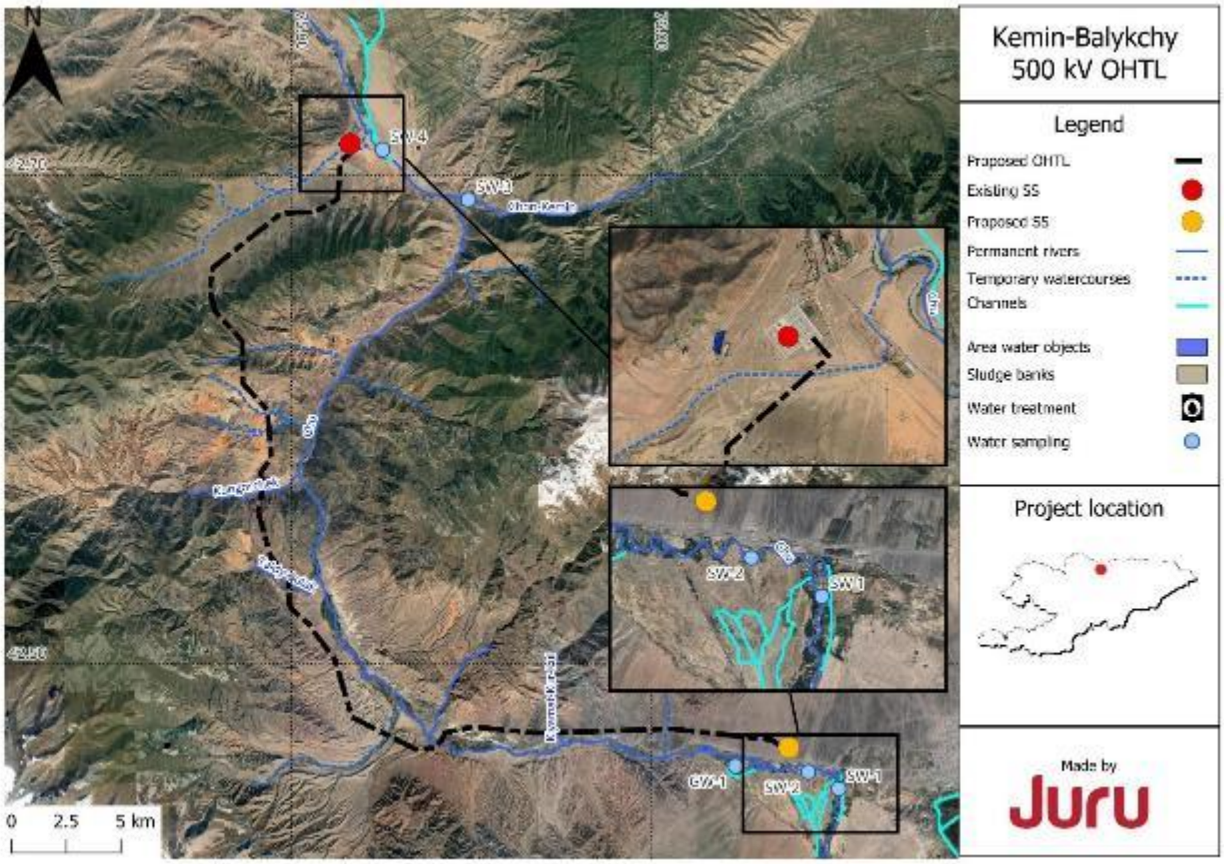
The proposed OHTL does not cross both channels.

The Chu River receives many tributaries along the OHTL route, the largest being the right-bank tributary, the Chon-Kemin River. Two additional right-bank tributaries exist between the villages of Kok-Moynok-1 and Kok-Moynok-2 (one identified as Kiyamat-Kur-Kul) and three periodically drying streams. On the left bank, there are two permanent and two temporary tributaries.

Artificial ponds near the Kemin substation are used for irrigation or livestock watering. Additionally, artificial fishery ponds are currently under construction on the southern outskirts of the village of Kok-Moynok-2. Known water bodies in the planned OHTL area are shown in Figure 64. In addition, consultation has raised a potential impact during construction on small streams and water courses used by herders and farmers near the NABU Wildlife Rehabilitation Centre location. The exact location of these streams is unknown, but once the route is confirmed they may be confirmed with local farmers.

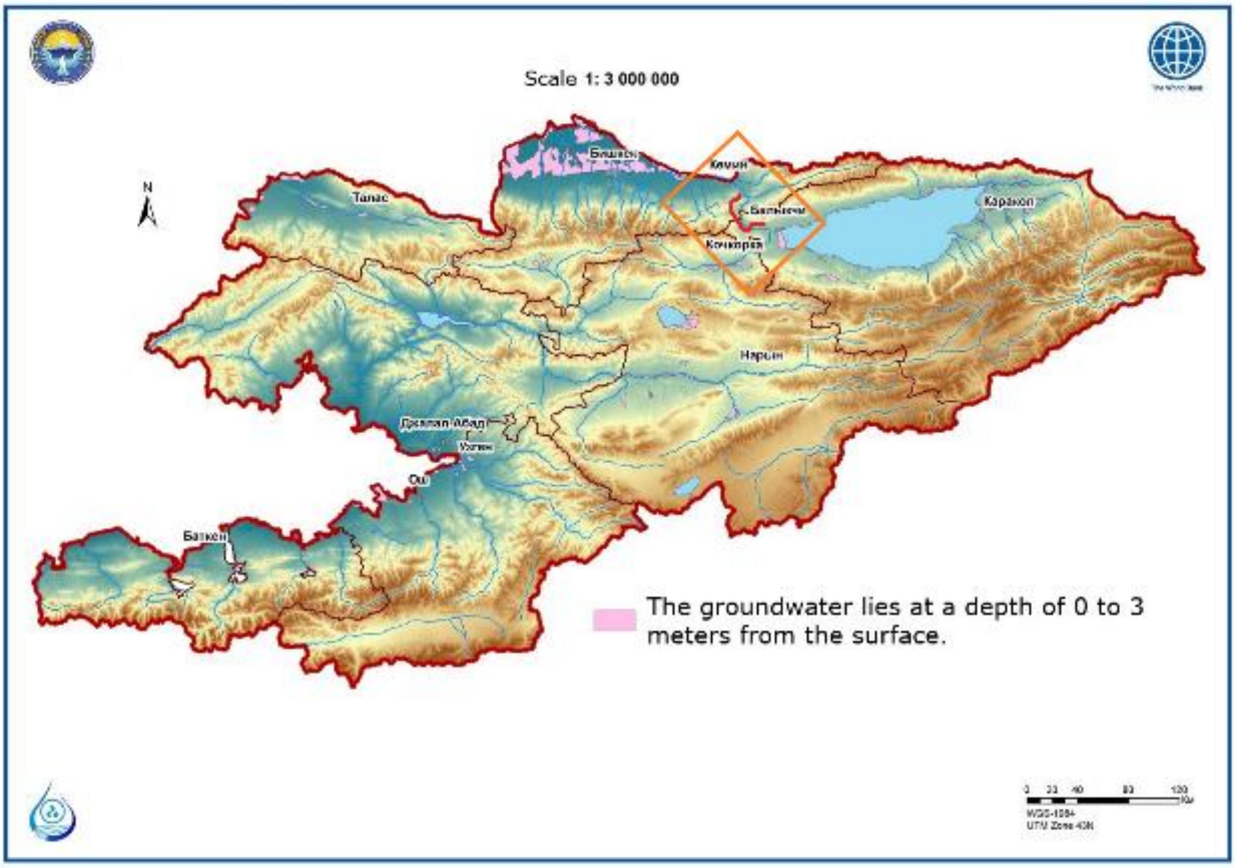
60 Long-term dynamics and seasonal changes in the hydrochemistry of the Issyk-Kul Lake basin (Kyrgyzstan). T. Asankulov, T. Abuduwaili, G. Isanova, M. Long, E. Duulatov. Arid Ecosystems, 2019, Vol. 25, No. 1 (78), pp. 79–87.

Figure 64: Surface water features along the OHTL ROW



Due to the underdeveloped nature of mountain soils, groundwater in Kyrgyz Republic's mountainous areas emerges on steep slopes and flows into river valleys through existing depressions. Figure 65 highlights areas where groundwater lies shallow (0–3 m) and may surface during flooding.

Figure 65: Zones of shallow groundwater in Kyrgyz Republic (Source: Flooding Zones Map, Ministry of Emergency Situations of the Kyrgyz Republic)



4.4.2.7. Surface and groundwater sampling

Water sampling was carried out in accordance with the established State standard 31861-2012 "*Water. General requirements for sampling*[61]'. The water sample points are strategically located to capture surface water from the nearest source to the project and within the project activity area. A one-liter water sample was collected and stored in polymer bottles for subsequent analysis in the laboratory. One sample of ground water was taken from existing borehole. The analyzed parameters are pH, Gross content (As, Zn, Al, Cd, Cu, Ni, Pb), Cr^{6+}.

The outcomes of the baseline survey work performed to date along the OHTL ROW confirm that water quality in the project AOI meets national standards[62] with low concentrations of heavy metals and an expected pH of 8.

61 Volume III, Environmental Baseline Report – Water, Juru , 2025.

62 The Resolution of the Government of the Kyrgyz Republic dated April 11, 2016, No. 201 (Hygienic standards "Maximum permissible concentrations of chemical substances in water bodies for domestic and drinking water use" according to Annex16).

4.3.12 Traffic and transportation infrastructure

The Kyrgyz Republic ranks 132nd out of 160 countries in the Logistics Performance Index (LPI) for 2018, scoring 2.38 out of 5, which is approximately 57% of the leading country's score. The main logistics challenges in developing countries, including Kyrgyz Republic, are:

- Limited quality of infrastructure, including roads, railways, ports, and ICT infrastructure.
- Low quality of logistics services, such as customs procedures and transport services.
- Lengthy export-import processing time.
- Lack of reliability in delivery performance.[63]

The general location is easily accessible via the nearby EM11 highway, making it convenient for the transport of equipment and materials. The EM11 connects cities in the Chui (including Bishkek), Issyk-Kul, and Naryn regions through other major highways. In the Issyk-Kul region, the EM11 splits, with the EM23 turning towards the Naryn region, and the EM11 continuing eastward to Balykchy city; then the EM11 changes to the EM07 leading to the farthest point of the region, linking cities such as Cholpon-Ata, Tyup, and the regional capital, Karakol. At the nearest point the EM11 passes within 1km of the existing Kemin substation and 1km of the proposed Balykchy substation.

From the Kemin SS, the OHTL ROW runs parallel to a local gravel road until the village of Kok-Moynok-2. At this point access is via the EM11. It is expected that materials and equipment will be delivered via the local gravel road (northern section) or the EM11 (southern section) to the OHTL ROW and then via small local gravel loads to access the OHTL ROW.

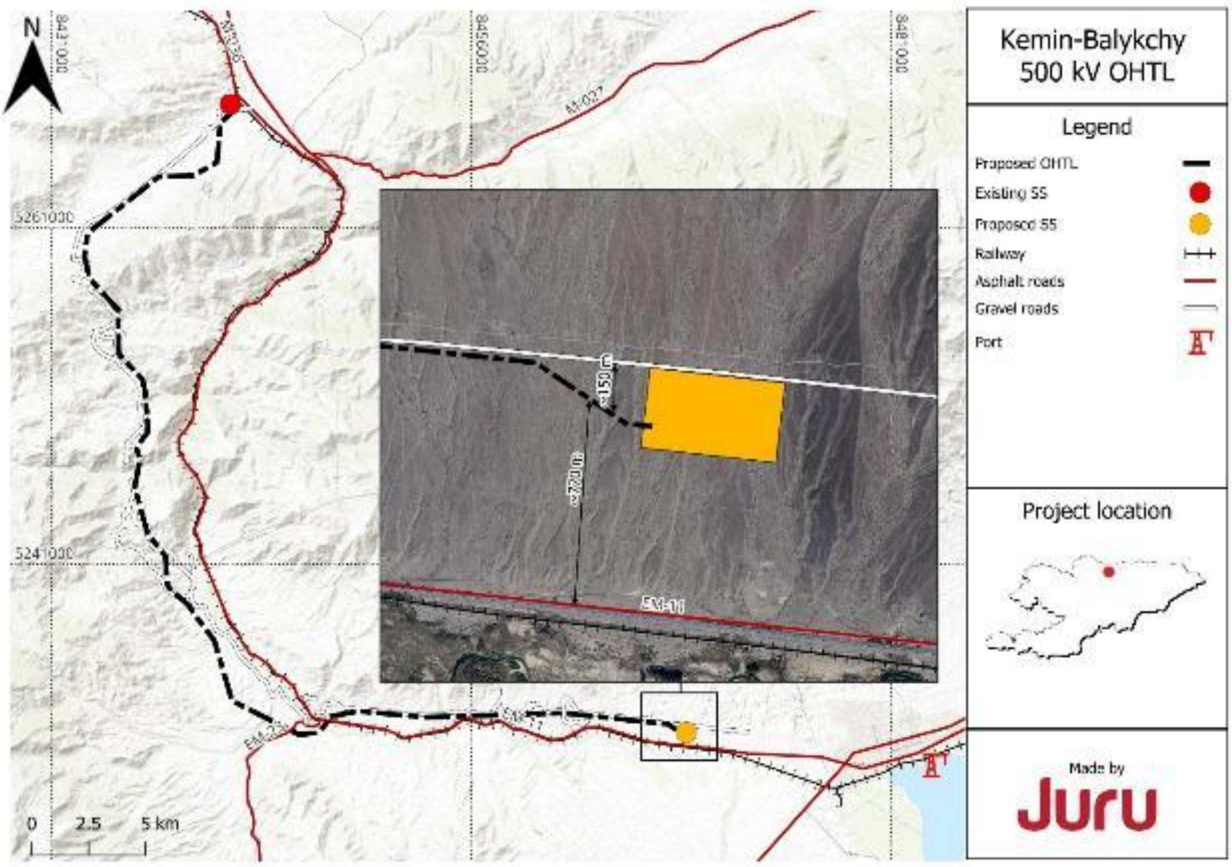
The traffic on the main (EM11) road and its proximity to a tourist zone have contributed to roadside economic activity, including eateries and shops. On both sides of the road, closer to the mountains, there are scattered households (Figure 16). Based on consultations, it has been confirmed that the primary activity in all the villages along the route is livestock grazing on pasturelands, which extend into the mountains within the project area, including the area of the planned OHTL.

A second transport artery in the vicinity of the Study area is the railway, which starts at the border in the Chui region, passes through Bishkek, and ends at the Rybachye station in Balykchy (Figure 17).

63 World Bank. 2018. The Logistics Performance Index and its Indicators. Washington, DC.

The main transport arteries in the Study area are shown in Figure 66.

Figure 66: Main transport arteries.



Traffic monitoring was conducted three times a day: in the morning (9 - 11 AM), during the day (1 - 3 PM), and in the evening hours (5 - 7 PM). HGVs, cars, vans, and motorcycles moving in both directions were taken into account[64]. The traffic monitoring showed that the traffic on the EM11 highway ranged from approximately 400-550 vehicles per hour, with a peak during the day and a minimum during the morning hours. At different times of the day, 10-15% of the traffic on this route consisted of HGVs, regardless of the time of day. On the M-036 highway, which branches off from the EM11 and runs near the Kemin substation and the village of Cholok, the traffic was around 100 vehicles per hour, nearly constant throughout the day (with only a slight decrease in the evening hours), likely due to the many popular roadside cafes in the village of Cholok. One monitoring point was located on a gravel road leading from the EM11 toward the NABU wildlife rehabilitation center. The traffic in this area was low, not exceeding one vehicle per hour.

64 Volume III, Environmental Baseline Report, Juru, 2025

4.3.13 Communication network

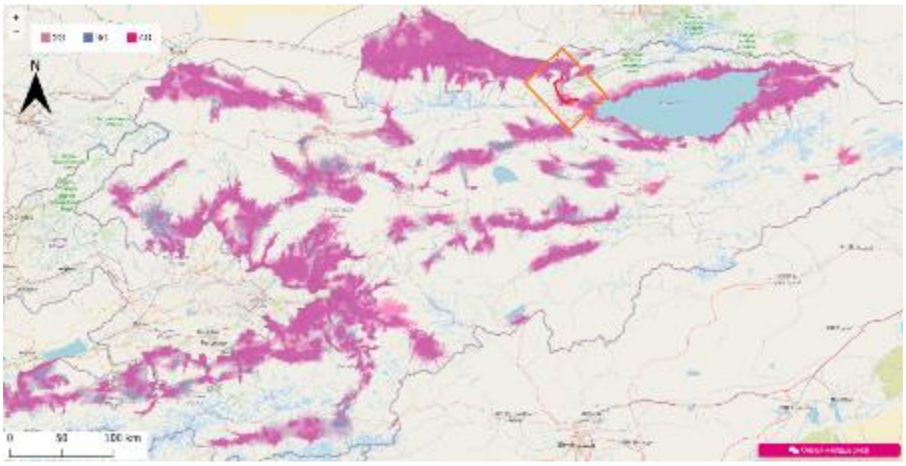
According to data from the State Communications Agency, by the end of 2021, 4G networks covered 96% of the 2,130 officially registered settlements in Kyrgyz Republic. However, 1.9% of the settlements remained outside mobile network coverage due to the absence of power transmission lines.

According to data from the country's major telecom operators, two major operators fully cover the eastern portion of the route (between the villages of Kok-Moynok-2 and Kok-Moynok-1) with mobile networks and the internet, with partial gaps only for one operator. No mobile networks serve the northwestern part (starting from the Kemin SS until Kok-Moynok-2). Coverage networks for Mega, O, and Beeline operators are shown in Figure 67 (a, b, c), respectively.

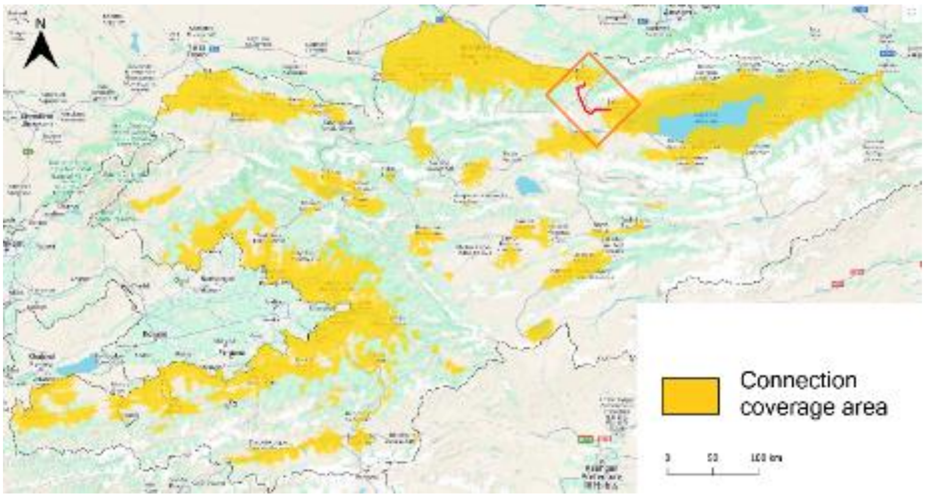
Open data also indicates the location of a DWDM point from the national communications operator, Kyrgyztelecom. DWDM (Dense Wavelength Division Multiplexing) is a system for transmitting and receiving information via fiber-optic cables. The nearest DWDM points to the AOI are located in the village of Toru-Aygyr, 19 km east of Balykchy, and in the village of Tegirmenti, 23 km northeast of the confluence of the Chu and Chon-Kemin rivers and the closest point of the OHTL route.

Figure 67: Communication network coverage maps (Source: Official websites of the Providers)

a)

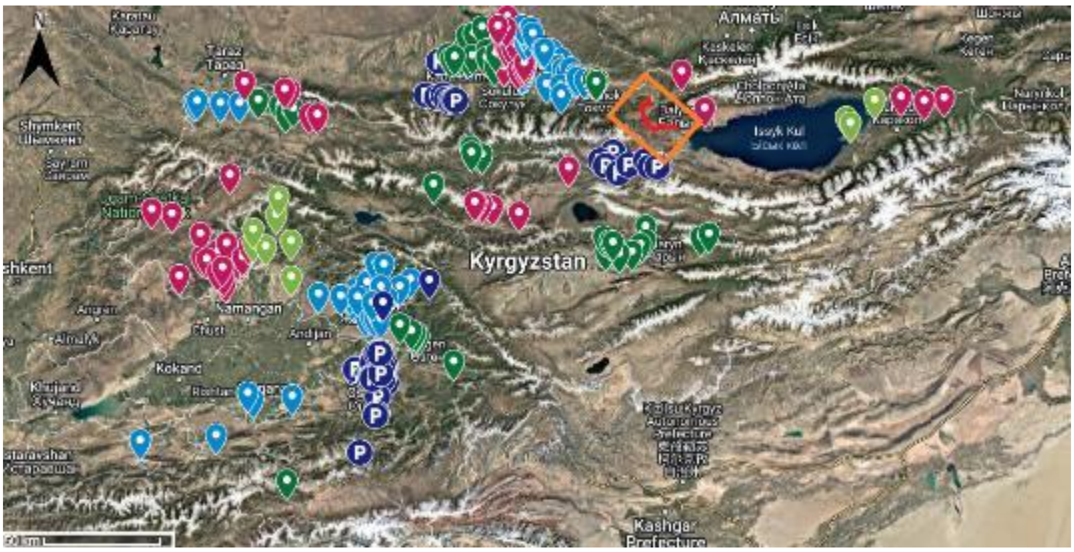


b)



c)

Figure 68: DWDM points



4.4 Land Use

The Study area route passes through two districts belonging to different regions: Kemin District in Chui Region and Balykchy city area (equal to district level) in Issyk-Kul Region traversing a variety of land types. According to the land use map (Figure 72), the Project route passes through lands primarily used as pastures or unused low-mountain zones which was confirmed during field consultations.

The following entities have been identified as potentially impacted by the Project. Further information is provided in Volume V, LARF as to the nature of the exact land use:

- The Municipalities (ayil okmotu and Kyzyl-Oktyabr) (for land that is not pastureland and the rights of way of the EM11 highway and Chu River);
- Pastureland Management Departments (Balykchy City, Orlovka City, Kyzyl-Oktyabr Ayil Okmotu);
- State Forest Fund (SFF) owned by Balykchy Forestry Enterprise - crosses forest fund lands (Figure 69, Figure 72) in three locations with a total length of approximately 2 km;
- Private land owners (where individual land users hold formal Certificates of Right to Use Land Share and designated for haymaking)
- Local communities and communal land users;
- Approximately 72 Herders (under land use contracts with PMDs and also those using the land unofficially); and
- Herb and plant collectors (a small amount of use of medicinal plants was identified from households in Kok-Moynok 1, it is unlikely that the Project RoW will significantly impact the collection of medicinal plants but they are noted for completeness).

Lands adjacent to the planned OHTL RoW also include energy sector lands (allocated for existing transmission lines and planned solar power plants), a land plot leased by the NABU wildlife rehabilitation center and fishponds under construction (Figure 70).

Figure 69: Land of Forestry Committee

Figure 70: Fishponds under construction

Figure 71: Administrative Boundaries of Pastureland Management Departments

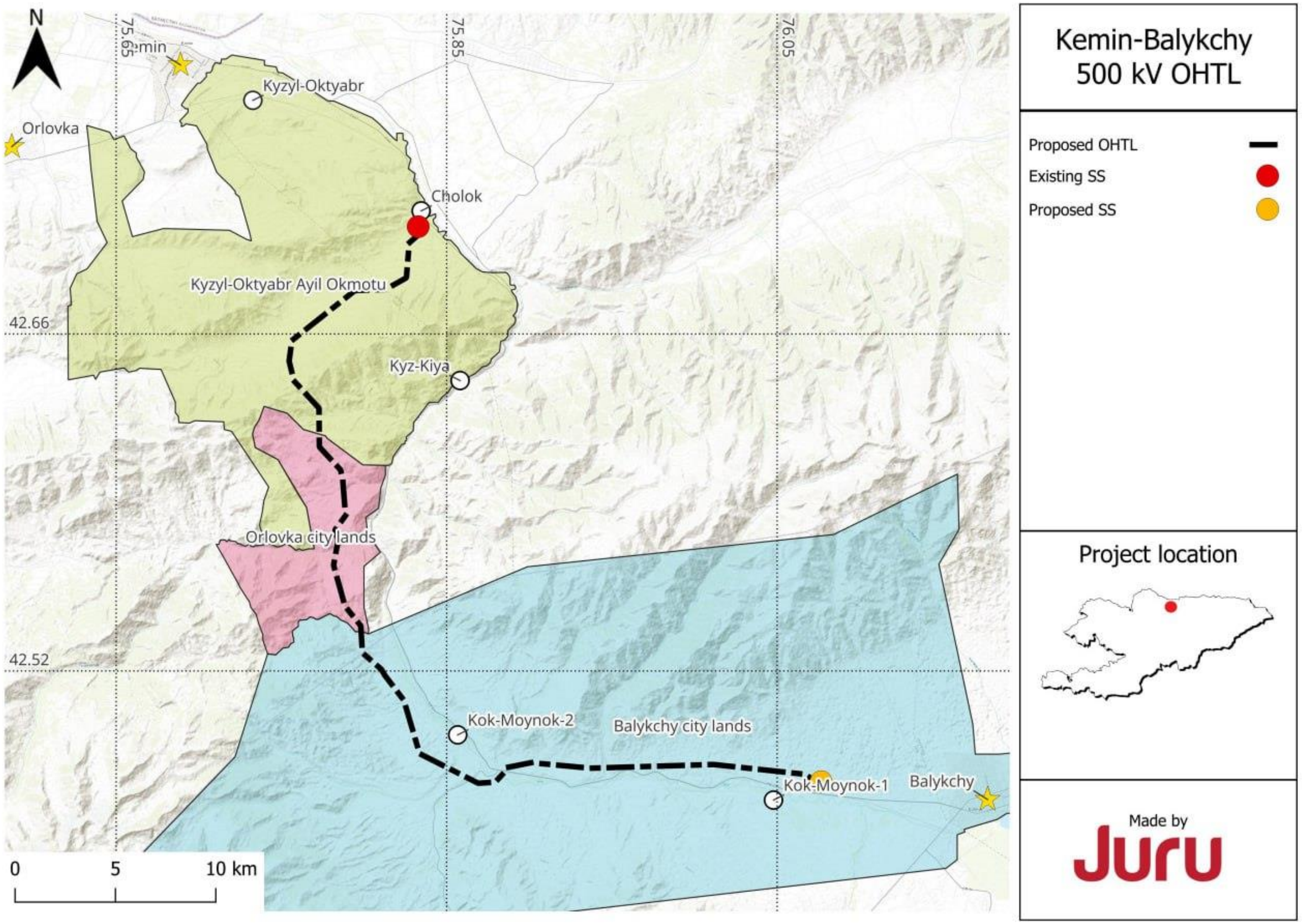
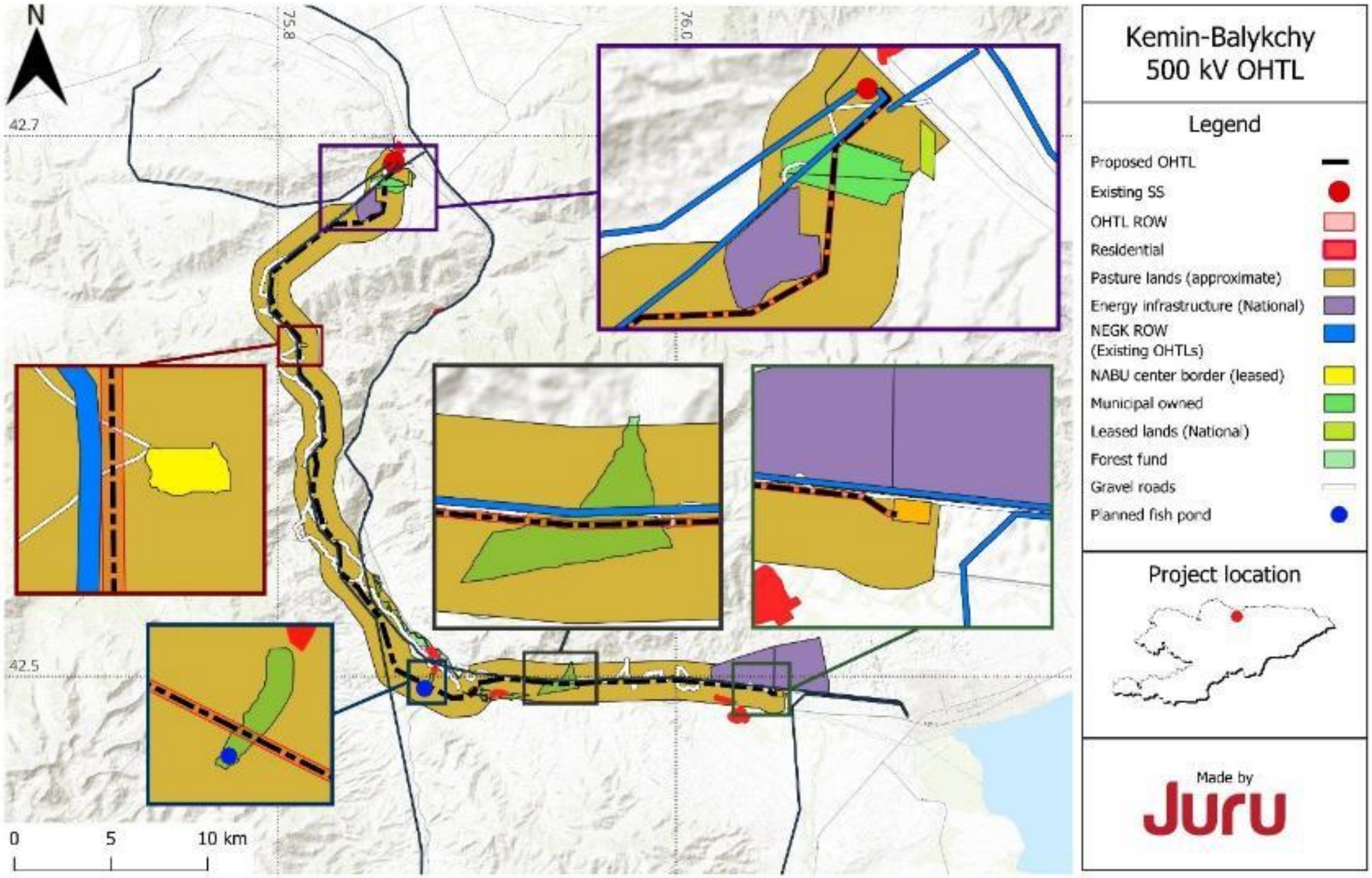


Figure 72: Project area Land use map



4.5 Socio-economic overview

4.5.1 Introduction

The direct social area of impact (AOI) includes the land and infrastructure within the right of way of the OHTL and the footprint of the Balykchy substation, and its owners and users. The landowners and users live in local communities. Members of these communities will also be indirectly impacted by the Project, as a result of construction traffic, noise, visual impact, community health and safety and potential impacts to tourism. To a lesser extent the population hubs of Balykchy and Kemin may also be negatively impacted from accommodation users and through the provision of other services. Local communities, residents of Balykchy and Kemin and businesses located along the EM11, may benefit from the Project, through provision of goods and services to workers, provision of accommodation facilities, and priority employment of local workers during the Project construction phase. A full impact assessment is provided in the following chapters.

A socio-economic profile of the AOI was developed through a socio-economic survey of households in the AOI communities, which was undertaken on April 3-11, 2025. The AOI communities are made up of:

- directly affected ayils- Kok-Moynok 1, Kok-Moynok 2, and Cholok
- indirectly affected ayils - Boroldoy, Dorozhniy, Kemin, Kichi-Kemin, Kyzyl Oktyabr, Sovetskoe, Jil-Aryk, Kiz-Kiya.

Other households not included in any ayils, located farther from the OHTL were also included in the survey to provide a better understanding of the social context. Since proposed OHTL crosses the pasture lands of the Orlovka city, the households from Orlovka were also surveyed.
Within the scope of the ESIA, a total 131 households were surveyed across from 12 ayils, Balykchy city and other households along the OHTL. Table 25 presents the distribution of surveyed households by ayil. Households from the Balykchy city were also surveyed, since according to the recent Administrative Territorial Reform (carried out based on the Decree of President, adopted on December 29,2024), the administration of the directly affected ayils – Kok-Moynok 1 and Kok-Moynok 2 was transferred from Ton District to Balykchy city. In addition to the household survey, focus group discussions (FGDs) were held in four ayils- Kok-Moynok 1, Kok-Moynok 2, Kyz-Kiya and Cholok to support this baseline assessment.

Table 25: Distribution of respondents by ayils

Settlement/village/Micro district/Ayil	Total number of households	Number of surveyed households	Percentage of the total households surveyed	Percentage of the surveyed population
Balykchy	n/a	18	n/a	13.7%
Boroldoy	517	6	1%	4.6%

Settlement/village/Micro district/Ayil	Total number of households	Number of surveyed households	Percentage of the total households surveyed	Percentage of the surveyed population
Cholok	15	7	46.6%	5.3%
Dorozhniy	32	6	18%	4.6%
Jil-Aryk	69	6	8%	4.6%
Kemin	2,728	9	0.3%	6.9%
Kichi-Kemin	602	6	0.9%	4.6%
Kok-Moynok 1	164	24	14.6%	18.3%
Kok-Moynok 2	116	14	12%	10.7%
Kyz-Kiya	22	5	22.7%	3.8%
Kyzyl-Oktabr	304	15	4.9%	11.5%
Orlovka	2,623	3	0.1%	2.3%
Other (households along the OHTL)	n/a	9	n/a	6.9%
Sovetskoye	192	3	1.5%	2.3%
Total	7,384	131	1.7%	100%

4.5.2 Demographics

The population of Kyrgyz Republic is 7,200,000[65]. The country's extensive mountainous terrain has resulted in a significantly lower population density compared to other Central Asian countries. As of the beginning of 2024, the population of the Ton district was 60,552, while the population of the Kemin district was 51,905.

The population of Balykchy city was 53,000 in 2022, and has grown approximately 58,000 people in 2025, reflecting the city's continued development. Kemin city population was 8,600 in 2022. The

65 https://stat.gov.kg/en/statistics/naselenie/

breakdown of the population of the two AOI ayil okmotus and four AOI ayils is provided in Table 26 below.

Table 26: Population of AOI communities (ayils)

No	Name of ayil okmotu	Name of ayil	Total population	Households
1	Kok-Moynok[66]	Kok-Moynok 1	1,035	164
2		Kok-Moynok 2	663	116
3	Kyzyl-Oktyabr[67]	Kyz-Kiya	87	22
4		Cholok	62	15
	Total		1,847	317

The total population across the four ayils is 1,847, with a nearly equal gender split – 50.8% male and 49.1% female. The gender balance varies slightly by community. In Kok-Moynok 1 and Kyz Kiya, the number of men is higher than women, while in Kok-Moynok 2 and Cholok women slightly outnumber men as shown in Table 27 below.

Table 27: Gender distribution of the AOI

Name of Ayil	Population	Male		Female	
Kok-Moynok 1	1,035	548	52.9%	487	47%
Kok-Moynok 2	663	313	47.2%	350	52.7%
Kyz-Kiya	87	50	57.4%	37	42.5%
Cholok	62	28	45.1%	34	54.8%
Total	1,847	939	50.8%	908	49.1%

Source: Minutes of meeting with the head of ayils and Passports of Kyzyl-Oktyabr and Kok-Moynok Ayil Okmotus

A total of 582 people live in the 131 surveyed households. The gender split of the population of the survey respondents is 46% female and 54% male, which is a greater gap than identified in the whole population, but within the variations identified in the individual ayils (shown in the table above).

[66] Kyzyl-Oktyabr ail okmotu passport.

[67] The total population statistics for the beginning of 2024 have been sourced from https://stat.gov.kg/en/statistics/download/operational/825/, while the household statistics have been taken from the passport of Kemin district for 2022.

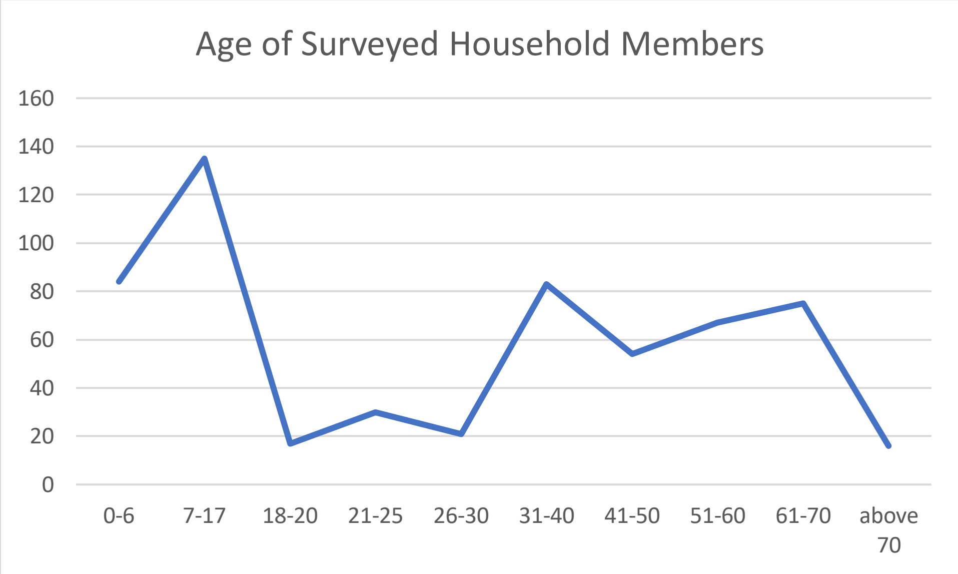
The majority of the households in the surveyed communities are male-headed households (90.8%), while female headed households account for 9.2% of all surveyed households. Most of the households consist of between two to six family members, however, two-person (19%) and four-person (18%) households are the most common. The smallest household was one person and the largest household in the survey area was 10 people.

The members of the surveyed households aged between 7-17 years made up the largest individual age group (23.2%), as shown in Table 28 and Figure 73 below.

Table 28: Age of surveyed household members.

	Frequency	**Percent**
0-6	84	14.40%
7-17	135	23.20%
18-20	17	2.90%
21-25	30	5.20%
26-30	21	3.60%
31-40	83	14.30%
41-50	54	9.30%
51-60	67	11.50%
61-70	75	12.90%
above 70	16	2.70%
Total	582	100%

Figure 73: Age of Surveyed household members.



Less than half (47%) of the population in the Project AOI is within working age (18-60 years). This is likely a result of high levels of migration from the AOI (discussed further below). The small percentage of working age residents will restrict the ability of the local communities to benefit from priority employment in the Project. This will be particularly difficult in towns, such as Jil-Aryk and Sovetskoye where they do not have any population under the age of 31.

Table 29: Age ranges of the AOI community

AOI community	0-6	7-17	18-20	21-25	26-30	31-40	41-50	51-60	61-70	above 70	Total
Balykchy	15%	23%	3%	3%	5%	19%	11%	9%	9%	4%	100%
Boroldoy	14%	18%	7%	0%	0%	18%	11%	11%	18%	4%	100%
Cholok	31%	17%	0%	3%	6%	25%	0%	6%	14%	0%	100%
Dorozhniy	19%	26%	4%	7%	0%	15%	7%	4%	7%	11%	100%
Jil-Aryk	0%	18%	0%	0%	0%	18%	18%	9%	27%	9%	100%
Kemin	12%	29%	0%	7%	0%	15%	10%	12%	15%	0%	100%
Kichi-Kemin	21%	35%	0%	0%	3%	21%	6%	6%	9%	0%	100%

AOI community	0-6	7-17	18-20	21-25	26-30	31-40	41-50	51-60	61-70	above 70	Total
Kok-Moynok 1	12%	25%	7%	9%	2%	11%	12%	9%	11%	2%	100%
Kok-Moynok 2	13%	21%	0%	5%	7%	14%	2%	18%	18%	2%	100%
Kyz-Kiya	16%	32%	4%	0%	12%	8%	0%	20%	8%	0%	100%
Kyzyl-Oktabr	12%	26%	3%	6%	4%	10%	13%	12%	12%	3%	100%
Other (households along the OHTL)	9%	3%	3%	13%	3%	9%	19%	22%	19%	0%	100%
Orlovka	18%	9%	0%	0%	9%	18%	0%	27%	9%	9%	100%
Sovetskoye	9%	27%	0%	0%	0%	0%	9%	18%	27%	9%	100%
Total	14%	23%	3%	5%	4%	14%	9%	12%	13%	3%	100%

4.5.3 Migration

Based on the statistics provided by the Kok-Moynok ayil okmotus, no immigration has been recorded over the past four years, while migration has steadily increased – from 65 people in 2021, to 86 in 2024. In Kyzyl Oktyabr ayil okmotu, approximately 50 household were reported to have had family members, who migrated - 20 households moved to other regions of Kyrgyz Republic, and the remaining 30 migrated to other countries[68].

Approximately 29% of the surveyed households stated that they have a household member who has migrated for work to other regions of Kyrgyz Republic or abroad. In total 52 household members migrated from 38 surveyed households. In most of these households (20%) one person had migrated, while 8% had two migrants and 2% had three migrants. Migration was more common among residents of Sovetskoye, where all households had at least one migrant, Boroldoy (67% of households have at least one person that migrated), and Kiz-Kiya (60% of households have at least one person that migrated) compared to other surveyed local communities.

[68] Kyzyl-Oktyabr ail okmotu passport.

Table 30: Percentage of households with migrants in the surveyed households by ayil

Surveyed zones	No migrants	1 person	2 people	3 people	Total
Balykchy	78%	17%	6%	0%	100%
Boroldoy	33%	67%	0%	0%	100%
Cholok	86%	0%	14%	0%	100%
Dorozhniy	67%	33%	0%	0%	100%
Jil-Aryk	67%	33%	0%	0%	100%
Kemin	78%	11%	11%	0%	100%
Kichi-Kemin	83%	0%	17%	0%	100%
Kok-Moynok 1	75%	8%	8%	8%	100%
Kok-Moynok 2	64%	36%	0%	0%	100%
Kyz-Kiya	40%	60%	0%	0%	100%
Kyzyl-Oktabr	80%	20%	0%	0%	100%
Other (households along the OHTL)	78%	0%	22%	0%	100%
Orlovka	100%	0%	0%	0%	100%
Sovetskoye	0%	33%	67%	0%	100%
Total	71%	20%	8%	2%	100%

Members of the Cholok FGD meetings mentioned that no one permanently migrates anymore, seasonal or on-off visits for work are more common. Previously, people went to Russia, but now most stay in Kyrgyz Republic due to available local trade. Local community members also move to bigger towns and cities seasonally to participate in the tourist trade.

4.5.4 Economy

The Economy of the Kyrgyz Republic primarily depends on agriculture, industry, services and construction – these sectors make up the country's GDP, which reached USD $17.5 billion in 2024. In the same year the economy grew by 9%, driven by strong economic domestic consumption, exports and investment.

Chui Region remains one of Kyrgyz Republic's most economically significant areas due to its fertile agricultural land, industrial infrastructure, and strategic location near the capital, Bishkek. The Gross Regional Product (GRP) for 2023 grew by 5.7%, reaching approximately 118.5 billion KGS (USD $1.35 billion), supported by strong growth in agriculture and industrial activities. Industrial production rose by 4.1%, amounting to 50.9 billion KGS.[69] Agriculture, forestry, and fisheries contributed 33% of the GRP. The manufacturing sector, heavily concentrated near Bishkek, accounted for 44% of the country's industrial production, focusing on food processing, textiles, and construction materials.

The Issyk-Kul Region continues to be a vital economic zone due to its tourism, agriculture, and mining activities. The Gross Regional Product (GRP) for 2023 increased by 5.2% to approximately 71.8 billion KGS, while industrial production accounted for 22.5 billion KGS, a growth of 3.6%.[70] Tourism is the primary economic driver of the region, with over 1.6 million national and international tourists visiting the region annually. Specific attractions include the Issyk-Kul Lake, located approximately 12.5 km from the planned Balykchy substation and will be crossed by the OHTL. In addition, two canyons of Kok-Moynok 2 ayil, are frequently visited by tourists. These are situated about 32 km and 34 km from the lakeshore. As most tourists visiting the lake also explore these canyons, contributing to the growth of the tourism sector in the AOI. This, in turn, supports local livelihoods and provides income generating opportunities for communities in the area. In 2023, the services sector, fuelled by tourism, contributed 40% of the GRP[71]. Agriculture provided 27% of GRP, with significant outputs in fruit farming, livestock, and fishing.[72]

Livelihoods in Issyk-Kul Region are highly seasonal, with households engaging in tourism-related jobs during peak months and relying on subsistence farming in the off-season. Fishing and trade along Lake Issyk-Kul's shores are also significant, while labour migration continues to support household incomes through remittances.[73]

Livelihoods in Kemin district (Chui Region) are diverse, with rural communities relying on farming, livestock, and agro-industries, while urban populations are engaged in commerce, services, and public administration. Labor migration to Russia and Kazakhstan remains significant, with remittances forming a critical income source for families.

Ton District (Issyk-Kul Region) plays a critical role in the agricultural and tourism sectors of the region. The district produced 6.3 billion KGS worth of agricultural products in 2023, representing 11.2% of the region's agricultural output. Ton's tourism revenue has grown steadily, thanks to its landscapes, beach resorts, and increasing interest in ecotourism activities.

[69] https://www.akchabar.kg/en/news/natsstatkom-zavershil-itogovie-rascheti-vrp-za-2023-god-otmetiv-rost-utbszkipjizonihw

[70] https://stat.gov.kg/ru/opendata/category/28/

[71] https://www.adb.org/projects/55250-001/main

[72] https://www.adb.org/projects/55250-001/main

[73] https://visitsilkroad.org/destination/kyrgyz-republic/issyk-kul/

Business owners that have businesses along the EM11 highway consulted during the April 2025 site visit, consider their primary advantage to be the location of the businesses along the highway. However, the primary challenges relate to the seasonality of their businesses (relying on tourism during the summer month). During peak tourism season their incomes are three to five times higher than in the off season.

The business owners believe the Project will have a positive effect on their businesses. Due to an increase in business from the workers and the general public. There is also a perception that improvement to the electricity supply will benefit the businesses.

4.5.5 Employment

In the Kyrgyz Republic most people are employed in four key sectors:

- Agriculture, forestry and fishing;
- Wholesale and retail trade including repair of vehicles and motorcycles;
- Construction; and
- Education.

Agriculture, forestry and fishing account for the largest share, with up to 20% of the employed population working in this sector. According to the statistics provided by the National Statistical Committee of the Kyrgyz Republic, only 38.8% of the employed population are women, indicating gender imbalance in employment.

In the AOI, a large portion of the population is engaged in informal employment or self-employment, particularly in farming and household activities. Official unemployment figures are low, but do not reflect labor market challenges, such as high rates of informal employment, especially in sectors like agriculture and construction. These sectors often offer low wages and limited job security. Other challenges include limited regulation of self-employment, high unemployment among women and youth, as well as high rates of labor migration (as discussed in Section XXX above) and seasonal work, which often lead to periods of unemployment and income instability.

The Kok-Moynok ayil okmotu passport shows that [74] that there are 2,412 people of working age in the ayil aimak there are 36 registered unemployed people. The Kyzyl-Oktyabr ayil okmotu[75] identifies 3,596 people (1,696 women and 1,900 men) of working age and the ayil aimak also has 36 registered unemployed people.

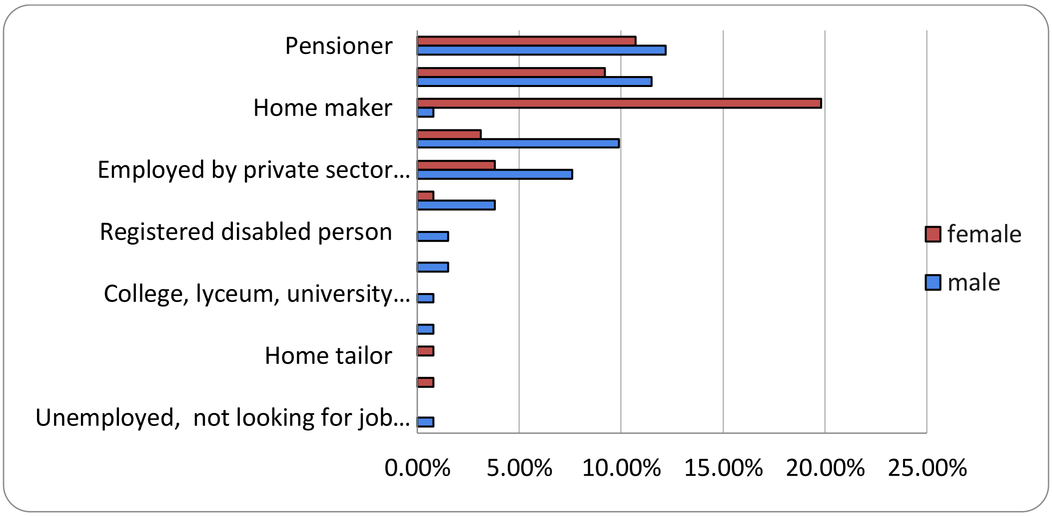
The survey results revealed that the majority of the respondents in the study area were pensioners (23%), homemakers (21%), or engaged in their household plots (4.6%). Among those employed, most worked in the government sector (21%), the private sector (11%) or in family farming (13%). Respondents from Kyz Kiya (59%), showed slightly higher rates of government employment,

[74] Kok-Moynok ayil okmotu passport
[75] Kyzyl-Oktyabr ayil okmotu passport

compared to other ayils, while Cholok (29%%) had a higher share of employment in private sector. Only 1% of the surveyed people were unemployed and were not searching for a job.

Sex disaggregated data, presented in Figure 74 below, show the employment level among adult males and females. Women are less likely to be employed in the government sector (9.2% compared to men -11.4%) and the private sector (3.8% versus 7.6% of men) and mostly work as homemakers (19.8%).

Figure 74: Occupations in the surveyed people aged 18+ by gender



Settlement/village/Micro district/Ayil	College student, lyceum, university	Employed in government	Employed by private sector	Employed on a farm by a non-family	Home maker	Home tailor	On maternity leave	Pensioner	Registered disabled person	Seasonal worker	Unemployed and not looking for a	Works in a family farm	Works on a household plot	Total
Balykchy	6%	17%	23%		23%			26%		6%				100%
Boroldoy			17%					66%				17%		100%
Cholok		29%	29%		16%			16%				11%		100%
Dorozhniy		17%	17%					33%				33%		100%
Jil-Aryk					17%			32%			17%	17%	17%	100%
Kemin		11%			44%			21%	11%			11%		100%
Kichi-Kemin		33%	17%		33%	17%								100%
Kok-Moynok 1		29%	4%		21%			17%	4%	4%		8%	13%	100%
Kok-Moynok 2		29%	7%	7%	26%			7%				7%	15%	100%

Settlement/village/Micro district/Ayil	College student, lyceum, university	Employed in government	Employed by private sector	Employed on a farm by a non-family	Home maker	Home tailor	On maternity leave	Pensioner	Registered disabled person	Seasonal worker	Unemployed and not looking for a	Works in a family farm	Works on a household plot	Total
Kyz-Kiya		59%			21%			21%						100%
Kyzyl-Oktabr		20%	13%		27%		7%	33%						100%
Orlovka			33%					33%				33%		100%
Other (households along the OHTL)		12%	12%									77%		100%
Sovetskoye					35%			65%						100%
Total	1%	21%	12%	1%	20%	1%	1%	23%	2%	2%	1%	13%	5%	100%

Residents of Cholok stated that it is difficult to find jobs in their community as few government jobs exist, and most people either participate in trade or are unemployed. Many workers in the area come from other ayils. There are no factories or industrial facilities nearby, so people have nowhere to work and nowhere else to find employment.

Participants in the Kiz-Kaya FGDs mentioned that most people from their community work at the railway. There are approximately 10 people in the community that are unemployed. There's just no work available. They also suggested that the lack of higher education could be part of the reason for the level of unemployment, as most of the community only have secondary level education.

According to the head of Kok-Moynok 1, residents work in diverse fields, such as teachers, tailors, agronomists, lawyers, railway and road maintenance, with some commuting to Balykchy or working from home. It is difficult to find work in Kok-Moynok 1 and many of the residents need to travel to places like Balykchy or Bishkek to find work, which adds extra expenses. They mentioned that, despite having education and qualifications, a lot of local residents remain unemployed because of low wages and the lack of stable job opportunities in the area.

In Kok-Moynok 2 the main occupations are livestock farming, teachers, working for the railway and there is one doctor. Some women from the community work in cafes in Balykchy. It is considered very hard to find a job in the community as there are no jobs available. Some people travel to Russia to find employment. FGD respondents commented that they have many unemployed people in the community who would benefit from working on the Project.

4.5.6 Influx of expatriate workers

Many of the members of the local communities have experienced an influx of foreign workers for other projects. French and Chinese teams have previously worked in Kok-Moynok 2 on the construction of high-voltage lines. There were no significant conflicts during those projects. A Chinese company worked on the construction of the Kemin substation. Some residents thought the foreign workers were untidy and unethical, while others thought relations improved once the workers had learned to speak some Kyrgyz.

When asked, AOI residents considered that impacts to them would not be significant, and an influx of workers could even benefit them through boosting the local economy. Local people could sell milk, yogurt, bread, etc. however, the workers would need to:

- Respect the ayil and maintain cleanliness;
- Not take away the employment opportunities of local community members; and
- Behave well and cause no harm to residents.

4.5.7 Income

The average per capita income in Kyrgyz Republic was 9,716 KGS per month[76] and the minimum wage in Kyrgyz Republic is 2,460 KGZ per month.

The average family monthly income reported by survey respondents was 95,123 KGS, (approximately USD $1,088), with a per capita income of 21,424.11 KGS (USD $245). Most income is derived from the sale of livestock, poultry and agricultural products (34%), from employment (19.6%) and entrepreneurial activities (14%) in the non-agricultural sector. However, it is important to note that not all communities and households are engaged in such businesses e.g. Kichi-Kemin, Orlovka, Sovetskoye, and other surveyed households along the OHTL do not get income from entrepreneurship in this sector at all.

The majority of households (34%) said that their income is more than enough, and they can buy anything. However, almost a third (29%) of respondents stated that their income was only enough for food, clothing and bills, and other basic needs. Residents of Kyz-Kiya and Jil-Aryk had the highest percentage of people that reported that they did not have enough income to cover basic needs and only 1.5% of the respondents (from Kichi-Kemin and Kyzyl-Oktyabr stated that they did not have enough income for even food.

Table 31: Household Income Sufficiency by Ayil

Settlement/village/ Micro district/Ayil	Income is more than enough, can buy anything	Income is enough for food, clothing and other basic needs	Income is enough only for basic needs (food, clothing, bills)	Income is not enough to cover basic needs	Income is not enough even for food	Total
Balykchy	72.2%	16.7%	5.6%	5.6%		100%
Boroldoy	33.3%	16.7%	33.3%	16.7%		100%
Cholok	28.6%	57.1%	14.3%			100%
Dorozhniy	33.3%	66.7%				100%
Jil-Aryk	33.3%	16.7%	16.7%	33.3%		100%
Kemin	22.2%	22.2%	33.3%	22.2%		100%

76 Average per capita income - Open Data - Statistics of the Kyrgyz Republic

Settlement/village/ Micro district/Ayil	Income is more than enough, can buy anything	Income is enough for food, clothing and other basic needs	Income is enough only for basic needs (food, clothing, bills)	Income is not enough to cover basic needs	Income is not enough even for food	Total
Kichi-Kemin	50.0%	16.7%	16.7%		16.7%	100%
Kok-Moynok 1	29.2%	25.0%	37.5%	8.3%		100%
Kok-Moynok 2	21.4%	35.7%	35.7%	7.1%		100%
Kyz-Kiya	20.0%		40.0%	40.0%		100%
Kyzyl-Oktabr	33.3%	13.3%	33.3%	13.3%	6.7%	100%
Orlovka	33.3%		66.7%			100%
Other (households along the OHTL)		77.8%	11.1%	11.1%		100%
Sovetskoye	33.3%	66.7%				100%
Total	33.6%	29.0%	25.2%	10.7%	1.5%	100%

Source: Socioeconomic survey.

Survey results showed that most households in the AOI spend their income to maintain their farm and garden, as well as their livestock, poultry and fodder (38%) and for food (21%). Table 32below provides information about the main expenses of the surveyed households.

Table 32: Main types of expenses of the surveyed households in the AOI

Types of expenses	Percentage of total expenses	Average expenses per household per month KGS	Average expenses per household per month, USD $
Taxes (payment) for public utilities (electricity, gas, heating, etc.)	2%	1,503.6	17.1
Food	21%	15,431.3	176.4

Types of expenses	Percentage of total expenses	Average expenses per household per month KGS	Average expenses per household per month, USD $
Purchase and delivery of water for drinking and domestic needs	0.2%	159.7	1.8
Medical treatment	6.7%	4,935.1	56.4
Transportation (Public and private)	8.2%	6,050.9	69.1
Education (purchase of school supplies, textbooks, contributions to the school fund, college and university expenses, payment of courses, tutors, etc.)	4.3%	3,160.8	36.1
Costs of farm/garden, including the purchase and maintenance of livestock, poultry and fodder	34.7%	25,464.2	291.2
Loan payment (if applicable)	13.2%	9,666.6	110.5
Other expenses	9.6%	7,066	80.8
Total	100%	73,438.7	839.7

The business along the EM11 highway that were interviewed stated that they are family owned, and they do not employ outside workers. Their income is variable with the tourism season. One earns between 1,000 and 3,000 KGS in the off season and 10,000 KGS during the peak season. They are also engaged in gardening activities on 10 hectares of land. The other business stated they earn 3,000 to 5,000 KGS in the off season and 15,000 KGS during the peak season. A café in Kok-Moynok 2, which is also a family business, earns approximately 2,000 - 2,500 KGS per day. There is a fish farm, which is under construction along the Project RoW. They have not yet launched the business and are not earning any income.

4.5.8 Loans

Approximately 56% of the surveyed households have taken out loans from banks. Out of the 73 responses, 62 disclosed the size of loan. Among them, 24 of the loans were taken out by female family members. The average size of the loan is USD $3,874.28 (approximately 338,910 KGS). The most common reasons for taking loans included purchasing livestock (24.7%), agricultural activities (22%), buying household equipment (17.8%), starting or supporting a business (12.3%), and buying cars (5.5%). Most of the loans were taken in 2023 (26%), 2024 (47%) and 2025 (22%) and are being repaid on a monthly basis.

Overall, the data suggests that the majority of the households expect to complete loan repayment within a short to medium term period (by 2026). A small share indicated uncertainty or longer timelines.

4.5.9 Labour rights

Kyrgyz Republic has ratified 54 Conventions of the International Labor Organization (ILO) to the date.[77] One of the most recent is the Convention №190 on the Elimination of Violence and Harassment in the World of Work, which Kyrgyz Republic ratified in 2024, becoming the first country in Central Asia to do so.

In 2024, a new Labor Code came into force in the Kyrgyz Republic, which introduced several new regulations, including electronic labor contracts and allowing for remote and hybrid work arrangements. The Code also introduced several worker protections. Employers are now required to provide lump-sum compensation, in the event of labor related injuries or the death of an employee. A single penalty rate of 0.25% has been established for late payments of wages, severance pay, and other compensation. Additionally, the code prohibits the employments of pregnant women and nursing mothers in hazardous and physically demanding jobs.78

Despite these legal advancements in labor protection, challenges remain in the enforcement of labor rights, particularly in rural areas, and within the informal sectors. According to the ILO, many workers, especially in agriculture and construction, operate without formal contracts and social protections.[79] Gender disparities also persist as of 2023, only 38.8% of the employed population were women, based on data from the National Statistics Committee Kyrgyz Republic.

Another significant concern involves trade unions. Despite many oppositions and a veto by the President, in 2021 the Parliament of the Kyrgyz Republic adopted a new law on Trade Unions. The law contains provisions that violate ILO conventions 87 (Freedom of Association) and 98 (Right to Organize and Collective Bargaining). The law states that the Federation of Trade Unions (FTUK) of the Kyrgyz Republic is the only recognized union, giving it a monopoly, and preventing workers from forming alternative unions. The law deprives unions of their independence by setting

[77] Full list of the Conventions ratified by the ILO can be found at: https://normlex.ilo.org/dyn/nrmlx_en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103529

78 New Labor Code comes into force in Kyrgyzstan. Available at: https://timesca.com/new-labor-code-comes-into-force-in-kyrgyzstan

79 National Programme on Transition from Informal to Formal Economy to be developed in Kyrgyzstan. Available at: https://www.ilo.org/resource/news/national-programme-transition-informal-formal-economy-be-developed

accountability to the government and employers and placing all unions in the country under the total control of the FTUK[80].

In addition to these challenges, child labor - particularly in its hazardous and forced forms -remains a serious concern in the Kyrgyz Republic, especially in agriculture and small-scale services (discussed in the section below).

4.5.10 Child labour

Kyrgyz Republic adopted the Children's Code in 2012 to protect and promote the rights of children in line with the Constitution and UN Convention on the Rights of the Child. The Code outlines principles such as non-discrimination, the best interests of the child, protection from violence and the right to family, education and adequate living conditions. Despite this legal framework, according to UNICEF nearly 900,000 children live in poverty in the Kyrgyz Republic, with limited access to education, healthcare and nutrition, especially in rural and southern regions.

Although the ILO Conventions on Minimum Age (#138) and Worst Forms of Child Labor Convention, 1999 (#182) are in force, the country has made only limited progress in addressing the worst forms of child labor. The main challenges that remain are due to the lack of up-to-date data on child labor, particularly informal child labor, including in the cotton sector and construction. Table 33 shows that while the majority of children are attending school, more than one third of children between the ages of 7-14 are combining work and school.

Table 33: Statistics on Children's Work and Education in the Kyrgyz Republic (2023)[81]

Children	Age	Percent of Population
Attending School	5 to 14	94.7%
Combining Work and School	7 to 14	38.4%

Among the surveyed households, 13% reported that their children were engaged in paid work, or working for free in their family farm or business (2%). Paid child labor was more frequently observed in Kyz-Kiya (39%) and Kok-Moynok 1 (25%).

80 Kyrgyzstan: New law on trade unions must comply with international labour standards. Available at: https://www.industriall-union.org/kyrgyzstan-new-law-on-trade-unions-must-comply-with-international-labour-standards

81 Child Labor and Forced Labor Report of Kyrgyz Republic, 2023. Available at:

https://www.dol.gov/sites/dolgov/files/ILAB/child_labor_reports/tda2023/Kyrgyz-Republic.pdf

Table 34: Paid child labour working hours in the AOI

Settlement/village/Micro district/Ayil	No children	No, they do not work	Yes, they are in paid employment	Yes, they work for free on the family farm/business	Total
Balykchy	34%	50%	17%	0%	100%
Boroldoy	17%	83%	0%	0%	100%
Cholok	28%	72%	0%	0%	100%
Dorozhniy	17%	83%	0%	0%	100%
Jil-Aryk	83%	17%	0%	0%	100%
Kemin	22%	67%	12%	0%	100%
Kichi-Kemin	33%	50%	17%	0%	100%
Kok-Moynok 1	21%	46%	25%	8%	100%
Kok-Moynok 2	50%	36%	14%	0%	100%
Kyz-Kiya	0%	61%	39%	0%	100%
Kyzyl-Oktabr	27%	60%	13%	0%	100%
Orlovka	35%	65%	0%	0%	100%
Other (households along the OHTL)	67%	33%	0%	0%	100%
Sovetskoye	35%	65%	0%	0%	100%
Total	33%	53%	13%	2%	100%

All households that have children that work stated that they either worked more than 8 hours per day in paid employment, or (in the case of only one quarter of the families in Kok-Moynok 1) more than eight hours on the family farm or business.

The following comments were raised regarding child labour during the FGDs.

- Cholok - Children do not work regularly, but some help during school vacations, mainly assisting in their parents' cafes. It is paid work, and contracts are signed between parents and their children.
- Kok-Moynok 1 - Children do help out with farming, and seasonal work like harvesting, especially during school holidays.

- Kok-Moynok 2 - Some children sell items along the roadside, while others work as waiters in cafes. In some cases, minors are employed without proper documentation.
- Kyz-Kiya - Unfortunately, it is not possible for children to find work; only those aged 18 and over can find work.

In addition to paid work, discussed above, all of the FGDs respondents stated that children actively help with household tasks such as taking care of livestock, mowing grass, and doing various other chores.

4.5.11 Human rights

The Kyrgyz Republic is a member of the United Nations and has ratified eight out of the nine cores international human rights treaties[82]. The only core treaty not yet ratified by Kyrgyz Republic is the Convention for the Protection of All Persons from Enforced Disappearance (CED).

The main governmental organizations responsible for protection and promotion of human rights in Kyrgyz Republic are the Ombudsman's Institute (Akyikatchy) and the National Centre for the Prevention of Torture.

The first Ombudsman of the Kyrgyz Republic was elected on 13 December 2002[83], following the adoption of the law "On the Ombudsman (Akyikatchy) of the Kyrgyz Republic" in the same year. While it acts as an independent advocate for human rights on behalf of private citizens and NGOs and has the authority to recommend cases for court review, both domestic and international observers have raised concerns about the office's efficiency and political independence.[84]

The National Centre for the Prevention of Torture was established in 2012 following the ratification of the Optional Protocol to the Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment (OPCAT) by Kyrgyz Republic. Major functions of the Centre include developing recommendations to improve detention conditions and supporting legal reforms to combat torture. It also prepares annual reports on torture prevention and submits them to the Jokorgu Kenesh (Parliament of the Kyrgyz Republic). During his recent visit to Kyrgyz Republic, UN Human Rights chief Volker Turk praised the Centre as a model for the Central Asian region, calling

[82] UN Treaty Body Database, Ratification Status for Kyrgyzstan. Available at: https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=93&Lang=EN

[83] Official website of the Ombudsman's Institute in Kyrgyzstan: https://ombudsman.kg/en/about#:~:text=On%2017%20May%202023%2C%20the,as%20the%20Ombudsman%20of%20Kyrgyzstan.

[84] Available at: https://www.state.gov/reports/2023-country-reports-on-human-rights-practices/kyrgyz-republic/

it the only independent national human rights institution in the region that meets international standards.[85]

4.5.12 Conflict and resolution

In Cholok there are sometimes conflicts that arise between local herders and outsiders who bring large herds to graze in local areas. The ayil okmotu handles pasture disputes. There are no police stationed in Cholok, as the ayil falls under the Kyzyl-Oktyabr jurisdiction. A local officer visits from there, and emergency contacts are posted in public places such as cafés. People generally trust the local officer, who visits regularly, helps resolve issues such as missing animals or thefts, and responds to incidents.

In Kok-Moynok 1 there is sometimes conflict over pasture use, it is most likely to occur with outsiders from nearby areas, such as Balykchy or Kemin. If such conflict does occur, usually the elders step in to resolve it. In the past, the pasture committee handled such issues, but their responsibilities have changed recently, and they are no longer approached in such situations.

The nearest police station to Kok-Moynok 1 is in Balykchy, which is about 8–12 km away. The police respond quickly, in around 10 minutes. Local community members' trust in the police varies. No major issues have occurred.

Similarly, in Kok-Moynok 2, there are not many conflicts related to pasture use, and not among locals, it would only occur if outsiders from Kemin or Balykchy cause disputes. People used to go to the land committees to resolve conflicts, but there was not a lot of trust in them, especially in recent years. They were dissolved in 2024 and have been merged with the municipality. So community members resolve conflicts themselves. They stated that it is hard to trust the municipality when they just take over and do not even inform the public.

The nearest police station to Kok-Moynok 2 is located in Balykchy, about 15 minutes away, and they do respond to calls.

There are no local conflicts within Kyz-Kiya. Occasionally, issues arise between different neighboring ayils (e.g., Kichi-Kemin and Kyzyl-Oktyabr). The Kyzyl-Oktyabr ayil okmotu handles disputes, if they arise and the level of trust in the ayil okmotu is very high. Residents believe the local government follows through on its promises.

The closest police station to Kyz-Kiya is in Kemin. Additionally, there is a local police officer that is assigned to the ayil. Respondents confirmed that the local police are generally trusted.

[85] https://www.ohchr.org/en/stories/2025/04/kyrgyzstans-vibrant-civil-society-fights-human-rights

Respondents from the four locations where FGDs were carried out all stated that there is no discrimination in their communities. That everyone is treated equally. While individual reactions may vary, the communities as a whole are respectful.

4.5.13 Civil society organizations

Kyrgyz Republic has long been recognized for its relatively vibrant and active civil society within the Central Asian region. It has numerous non-governmental organizations (NGOs) engaged in areas such as human rights, social services and public policy. However, some of the recent legislative acts raised concerns regarding the restrictions on freedom of association. One of them is the Law of the Kyrgyz Republic on Amendments to the Law of the Kyrgyz Republic on Noncommercial Organizations (also known as the Law on Foreign Representatives) signed on April 2, 2024. According to the analysis by the International Center for Non-For-Profit Law (ICNL)[86], the law requires NGOs receiving foreign funding and engaging in broadly defined "political activity" to register as "foreign representatives" and comply with burdensome obligations, such as audits, labeling materials, and bureaucratic reporting procedures. It also gives the Ministry of Justice broad powers to inspect, suspend and initiate the liquidation of such organization without court approval, which raises concerns about the legality and non-discrimination of such actions. The OSCE Office for Democratic Institutions and Human Rights (ODIHR) and UN Special Rapporteurs stated that the adoption of this law contradicts both the country's international obligations and provisions of the Constitution of the Kyrgyz Republic (articles 36, 32, 24 and 29) which protect the right to freedom of association and other fundamental rights.

Survey and FGD respondents were asked if any NGOs/ayil-based organizations operate in their area. Only 33% stated that they were aware of such organizations in their communities. Half of the respondents said that there are no NGOs working in their area, and 17.6% were unaware of any NGOs in the area. The organizations that were mentioned are primarily involved in resolving disputes, supporting women affected by violence and assisting children with disabilities, providing financial help to orphaned children, and organizing annual recreational events. Some specifically named organizations are an NGO called Baktyluu Ene, which is a women's shelter, and the Red Crescent Society which supports Kok-Moynok 1 ayil.

4.5.14 Gender

Women's rights continue to be a critical human rights issue in the country. The Kyrgyz Republic has already adopted several laws in the sphere of protecting women's rights and promoting gender equality and combatting against the gender-based violence, among them Law "On State Guarantees for Ensuring Gender Equality" (2003), Law №63 of the Kyrgyz Republic "On the Guard

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[86] ICNL Analysis of the Law of the Kyrgyz Republic on Amendments to the Law of the Kyrgyz Republic on Noncommercial Organizations (also known as the Law on Foreign Representatives). Available at: https://www.icnl.org/wp-content/uploads/2024.04-Final-Analysis-of-the-KR-Law-on-Foreign-Representatives_eng-vf.pdf

and Protection Against Domestic Violence" (2017) and the Criminal Code of the Kyrgyz Republic which criminalizes domestic violence sexual assault, forced and child marriages and the traditional practice of bride kidnapping. However, reporting of gender-based violence remains low due to stigma, limited services and weak institutional response. In the first eight months of 2023, the Ministry of Internal Affairs registered 8,502 domestic violence complaints. It was stated that the actual number of violence cases is three times higher than this figure.[87]

Despite being illegal, bride kidnapping still occurs. A 2021 UN estimates found that about one in five marriages in Kyrgyz Republic began this way, often leading to abuse, early marriage, and restrictions on women's education and work. This practice also contributes to polygamy and sexual violence, including rape.

In recent years, the government has taken steps to improve the legal and policy framework for gender equality, including the adoption of the National Gender Equality Strategy for 2022-2030[88] and National Action Plans to combat gender-based violence. However, implementation remains inconsistent particularly in rural and remote areas.

In the study area, most household tasks such as cooking (84%) and laundry (83%) are carried out by adult females. Only in shopping men participate to some extent, with men reported to handle the shopping in 20% of surveyed households. Elderly people also help with cooking (6.9%) and shopping (6.9%). Children mostly do not participate in household tasks, though they occasionally assist with laundry (3.8%) and shopping (2.3%).

Focus group respondents had the following comments on women's participation in society:

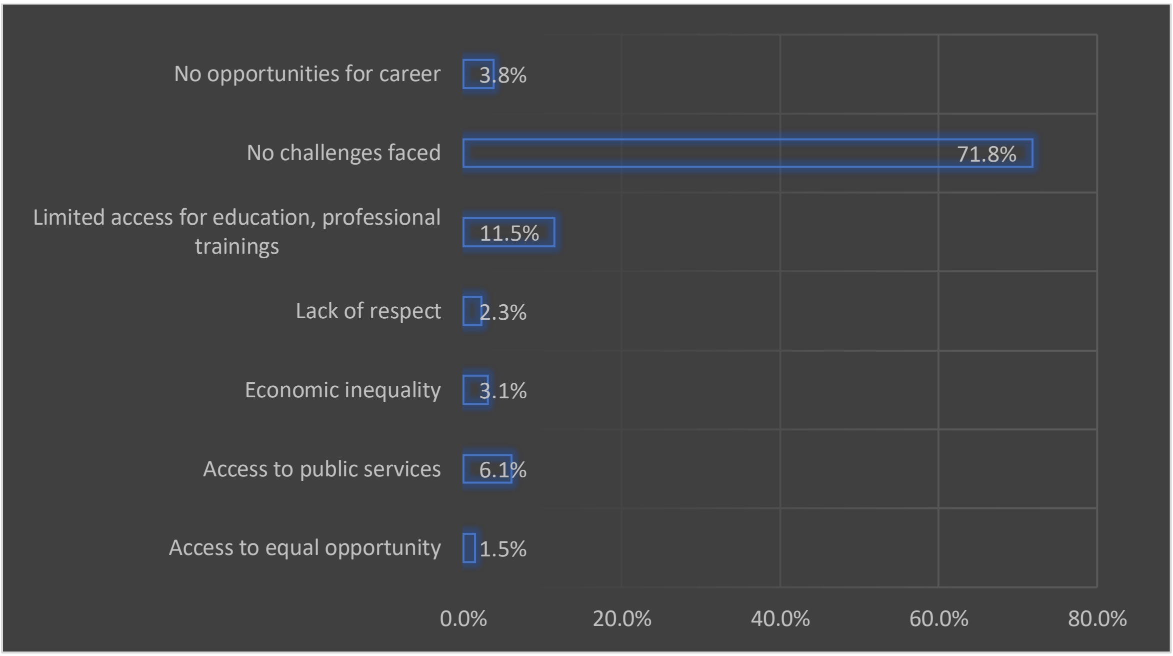
- Kok-Moynok 1 -Within the household, women are regarded as the ones truly in charge. While men may be more vocal or visible, it's often the women who manage things behind the scenes.
- Kok-Moynok 2 - Women play an essential role in the household. They are responsible for cooking, cleaning, caring for children, and also feeding the animals when their husbands are away. Their role is primarily centered around domestic responsibilities.
- Overall, women are doing well and play a vital role in the community. In many cases, they are the main earners, especially in families without livestock. Women often work outside the village, with many going to Balykchy for employment or running small businesses. Most of the teachers in the community are also women.

87 https://24.kg/vlast/276024_bolee85_tyisyachi_zayavleniy_onasilii_vseme_zaregistrirovali_vkyirgyizstane_/

88 National Strategy of the Kyrgyz Republic on Achieving Gender Equality until 2030. Available at: https://cbd.minjust.gov.kg/159472/edition/1189691/ru

When asked about the main challenges faced by the female members of the household in the ayil, the majority of survey respondents (72%) stated that they do not face any significant difficulties, only some of them mentioned obstacles including, limited access to education and professional training (11%), restricted access to public services (6%), and a lack of career opportunities (4%).

Figure 75: Challenges faced by female members of surveyed households



FGD participants raised some additional challenges faced by women in their communities. They had the following comments:

- Cholok – There are no specific women's issues, the challenges they face (such as distance to study) are general to the whole community, not unique to women. Women here carry a heavy load. Many work full-time, but that's just the start - they also handle all the housework and childcare. Some even take on two or three jobs because government salaries aren't enough, especially if their husbands are unemployed.
- Kiz-Kiya – There is nothing here for the youth. There are no sports facilities and nowhere to relax or unwind. There's just nothing available for us here.
- Kok-Moynok 1- Women face the challenge of balancing both employment and full household responsibilities. Additionally, community and sports activities are usually centered around men, which often leaves women feeling excluded from public life.
- Kok-Moynok 2 -Women definitely face challenges—unemployment is one of the main issues. Many have to travel to Balykchy for work to support their children. There are also no kindergartens for small children, which makes things harder. Additionally, childbirth can be very stressful due to delays in ambulance response times, which puts both mothers and babies at risk.

Women respondents of the FGDs requested that the Project provide jobs for women. They would be particularly interested in support roles, such as cooking, cleaning, or office work, especially if well-paid. There's a willingness to work and learn new skills, especially if it means additional income. Training for women in income generating activities is also considered important.

4.5.15 Gender Based Violence (GBV)

Although, physical sexual assault is criminalized, verbal sexual harassment is not explicitly prohibited by law. According to UN Women, approximately 25% of women experienced sexual harassment in the workplace, with the majority occurring at government institutions[89].

Health representatives in Balykchy stated that GBV is not prevalent in the city. They get approximately 14 cases per year, which they take seriously. They reported that there may be cases that are not recorded, but they do not see any significant increase in the number of incidents of violence year on year.

There is a crisis centre/NGO called "Baktyluu Ene" in Balykchy city, especially for women who need a place to stay temporarily. If "Baktyluu Ene" cannot take them, women are referred to social services. The hospitals work closely with the mayor’s office, particularly the social development department.

Health professionals in Kemin stated that they do encounter cases of domestic violence almost daily. Severe physical abuse cases are relatively rare, but what they see more commonly is psychological or emotional violence—frequent arguments, shouting, and verbal aggression. Official data does not always reflect this reality. Many women initially report incidents but later withdraw their complaints, often choosing to reconcile or to avoid formal proceedings.

There is a facility for victims of GBV called Nurmeeyasa in the town of Orlovka (approximately 13km from Kemin). It is a private initiative and primarily focuses on child and family support.

In Cholok FGD respondents stated that men’s treatment of women varies: Generally, in this community, men understand and respect women. Things have improved a bit—less domestic violence, more involved fathers—but the pressure on women has not eased. In rural communities, domestic violence is often hidden because women are too ashamed to speak up.

In Kiz-Kiya women are seen as dependent, so if a wife keeps arguing with her husband, she might get beaten. However, if she speaks carefully, she might be able to avoid that.

The head of Kok-Moynok 1 stated that they consider GBV and domestic violence to be a problem of the past and not seen as an issue in the community today. Kok-Moynok 2 FGD and women’s group also reflected this sentiment, with the women’s group adding that disagreements do occur, but physical violence is now rare. Alcohol consumption has decreased, and younger men tend to handle conflicts differently compared to the older generation.

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[89] Executive summary of the 2023 Country Report of the Kyrgyz Republic on Human Rights Practices available at: https://www.state.gov/reports/2023-country-reports-on-human-rights-practices/kyrgyz-republic/

4.5.16 Prostitution

The Project's location, near to a major highway and close to a number of tourist locations, raises the potential for prostitution. Balykchy health professionals have stated that they have no confirmed information or awareness of prostitution in the area (or "Imish-Imish" slang for sex work). They noted that the biggest concern with an increase in prostitution or sex work would be increased transmission of HIV/AIDS, particularly among young people, there are services supporting people living with HIV (PLHIV) in Balykchy. There is no current indication that the EM11 highway is associated with such activity near Balykchy. It was suggested that Cholpon-Ata (a more developed tourist area approximately one hour's drive from Balykchy) might see more sex work due to tourism. The professional that was consulted, opined that the influx of workers should not impact the presence of prostitution or sex work.

Health workers in Kemin were also unaware of any sex work or prostitution in the area. They mentioned that the state is increasingly involved in eliminating sex work, and in Bishkek, they are closing down locations where there is sex work. The State Committee for National Security (SCNS) is involved in eradicating sex work.

4.5.17 Access to education

According to UNICEF[90], access to pre-schools is available to only about 24% of children in the Kyrgyz Republic. In Kyrgyz Republic there are 2,394 schools (basic, secondary and tertiary education facilities). In Issyk Kul oblast there are 201 schools and in Chui oblast there are 317 secondary schools, the oblast with the second highest number of schools in the country.

Kemin and Balykchy, as the two largest population hubs along the Project route, host a range of educational facilities serving their respective communities. In Kemin district, there are 29 secondary schools (including 28 secondary schools and 1 incomplete secondary school), 19 vocational lyceums and 21 preschool educational institutions. Additionally, the Kemin Private Special Boarding School for Orphans and Children Without Parental Care operates under the 'Yraym' Charitable Foundation. In Balykchy city, the total number of education facilities is 29, including two colleges, 12 schools, 11 preschool educational institutions, and one preschool educational center91.

Kindergartens are accessible in most ayils, except Kok-Moynok 1 and Kok-Moynok 2. Schools are accessible in all AOI communities, with the exception of Jil-Aryk. Colleges and professional lyceums are only available in Kemin, and no higher educational institutions were reported in any of the surveyed communities. Children from Cholok and Kok-Moynok 2 are transported to school and kindergarten to Kyzyl-Oktyabr ayil by a government-provided bus. In Kyz-Kiya there is a

[90] https://www.unicef.org/kyrgyzstan/children-kyrgyzstan

91 Education - Statistics of the Kyrgyz Republic

kindergarten available. The quality and accessibility are considered acceptable by community members. The Kok-Moynok 1 community is seeking support to improve education facilities in their community. While teachers are available, there's a lack of facilities, no gym or sports field for physical education, and no labs or proper equipment for subjects as physics and chemistry. Students face challenges due to these limitations.

There are three educational establishments in Kok-Moynok ayil okmotu, two of them are in the Project AOI. Kok-Moynok 1 has a secondary school with an enrolment of 201 students, while Kok-Moynok 2 has an elementary school with an enrolment of 82 students. The Kyzyl-Oktyabr ayil okmotu oversees eight educational establishments, comprising three schools and five kindergartens.

School attendance among AOI children in education remains low. Of all of the surveyed households 45% have kindergarten aged children, yet only 19% said that their children attend kindergarten. Attendance rates varied across communities. In Sovetskoye, Kyz-Kiya (each with 100% attendance of kindergarten age children), Cholok, Kichi-Kemin (each 75%), Boroldoy, and Dorozhniy (each 66.7%) kindergarten attendance was higher compared to other ayils.

In contrast, 67% of surveyed households had school-age children and 78% of them reported that their children were attending schools. School attendance was highest in Dorozhniy, Sovetskoye and Jil-Aryk (all 100. However, in other households along the OHTL and (33%) Orlovka (50%) the attendance rate was low.

Table 35: School attendance rate of children in the surveyed households

Settlement/village/Micro district/Ayil	Do not attend school	Attend school	Total
Balykchy	17%	83%	100%
Boroldoy	40%	60%	100%
Cholok	40%	60%	100%
Dorozhniy	0%	100%	100%
Jil-Aryk	0%	100%	100%
Kemin	14%	86%	100%
Kichi-Kemin	0%	100%	100%
Kok-Moynok 1	16%	84%	100%
Kok-Moynok 2	29%	71%	100%
Kyz-Kiya	20%	80%	100%

Settlement/village/Micro district/Ayil	Do not attend school	Attend school	Total
Kyzyl-Oktabr	27%	73%	100%
Orlovka	50%	50%	100%
Other (households along the OHTL)	67%	33%	100%
Sovetskoye	0%	100%	100%
Total	22%	78%	100%

The majority of the respondents said that schools have either all necessary facilities (48%), or at least basic facilities (42%). A smaller portion (8.4%) expressed dissatisfaction with the conditions, especially in Kok-Moynok 1.

4.5.18 Educational attainment

The percentage of the population in Kyrgyz Republic that had completed basic general education (grades 1-9) as of 2023 reached a level of 101%[92] with boys at 100% and girls at 101%[93] Almost all the population of the Kyrgyz Republic has at least a secondary education with 93.5% of the population completing secondary education in 2023. Slightly less boys (92.3%) than girls (94.7%) have a secondary school education.

As of 2023, 24.6% of the working population, had a higher or incomplete higher education level with, 50.1% being male, and 49.8% female. Only 1% of the working population lacked general primary education or were illiterate, of whom, 86% were male.[94]

Basic education attainment in Issyk Kul Oblast was lower than the national average in 2023, with 91.1% of the population completing basic education. Boys had a higher basic education attainment

92 Exceeding 100% is due to internal migration flows of the population, as well as to the presence in the contingent of students of a population older or younger than the established education age (7-15 years).

93 Education - Statistics of the Kyrgyz Republic

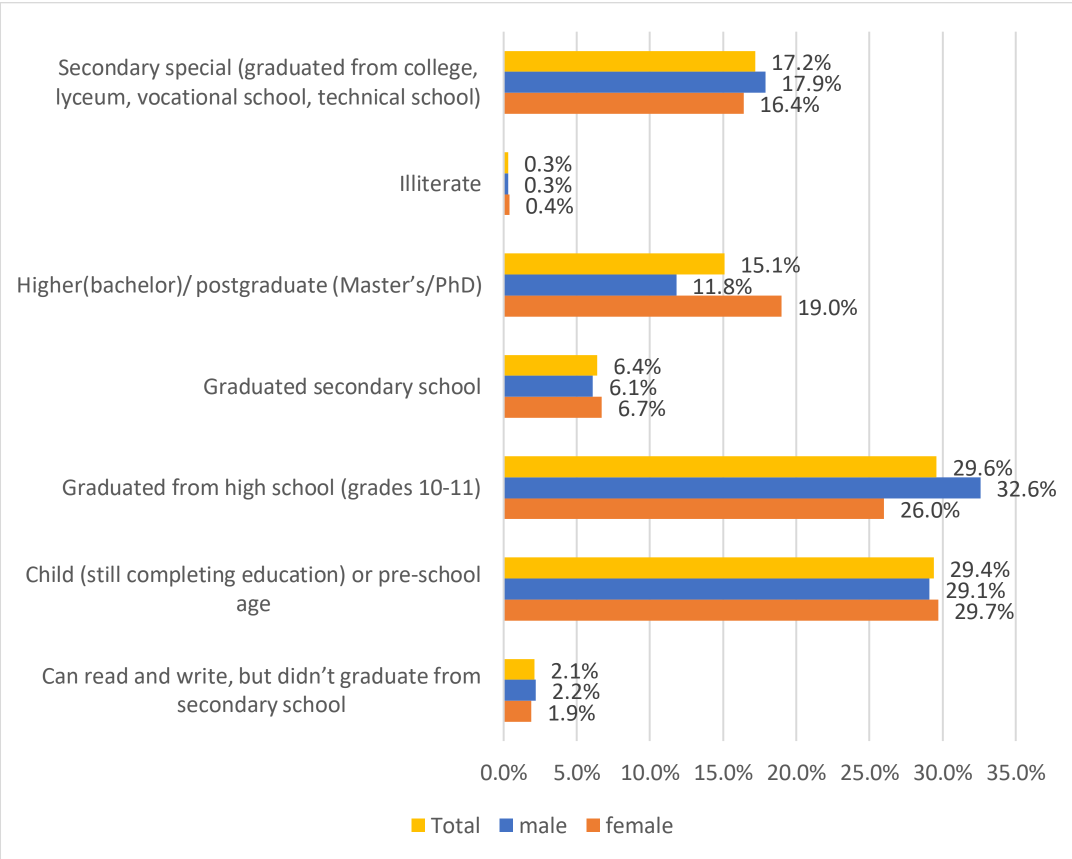
94 Employed population by sex and education, Open Statistics of the Kyrgyz Republic. https://stat.gov.kg/en/statistics/zanyatost/

rate in the oblast (91.7%) than girls (90.4%). Secondary education attainment is also lower in Issyk-Kul oblast, with a total of 85.1% (84.4% for boys and 85.8% for girls)[95].

Basic education attainment in Chui Oblast was higher than the national average in 2023, with a total of 105.1%. Boys and girls had almost the same attainment levels, with boys at 105.1% and girls at 105%. Secondary education in Chui Oblast is also slightly higher than the national average at 95.6%. Boys' levels of secondary education are lower than girls' as 94.3% compared to 96.9%[96].

Overall, the education level of the people in the surveyed households was relatively high, with the majority of them (29.6%) having completed high school education or having attended college or lyceum (17.2%). A total of 15% of them reported holding a bachelor's or master's degrees. The share of women (19%) with higher education exceeded that of men (12%). Only 0.3% of the population (2 people – one man and one woman) were illiterate.

Figure 76: Education level of the people in the AOI



95 Ibid.

96 Education - Statistics of the Kyrgyz Republic

4.5.19 Access to health services

In Kyrgyz Republic there are 193 hospitals, 43 Clinics, 21 Family medicine clinics, 667 family general practitioners, 1,080 general care or obstetrical units, and 151 paramedics/ambulance services97. Despite the number of facilities, medical professionals have raised concerns that there's a shortage of healthcare professionals across the country.

In Balykchy city a unified healthcare system operates under the Centre of General Medical Practice, which includes both polyclinic and hospital services. The city has 5 paramedics and midwifery stations (PMS) with a total of 398 medical personnel, including 74 doctors, and 185 nursing staff. This staffing level is insufficient and 24 additional doctors, and 30 more nurses are needed to meet demand.

The Balykchy city hospital currently has 250 beds, and it is seeking funding to build a two-story health complex for medical tourism with a capacity of 250–300 beds. In addition to the main centre, there are five PMSs: Issyk-Kul PMS, located in Balykchy, serves the upper part of the city. Kok-Moynok-1, Kok-Moynok-2, and Ak-Olon PMSs are located in nearby rural areas. Orto-Tokoi PMS is currently not operational, but there are plans to rebuild and restore it within this year. PMSs are staffed exclusively by paramedics. In areas farther away medical response would require calling an ambulance.

Balykchy has a trauma department and a trauma center. The trauma department has four doctors on duty. In Balykchy city they increase the number of hospital beds during the summer months due to a rise in admissions caused by road accidents and other emergencies during the tourist season. Balykchy city has four ambulances. One is under repair, and three are currently active. Typically, it takes 20 to 30 minutes at most for an ambulance to arrive.

In Kemin district, healthcare services include, a tuberculosis hospital, 23 PMS, seven general family practices, a Center for General Medical Practice and a Center for Family Medicine. The district is served by 42 doctors, 179 nurses, 23 paramedics and five ambulance stations. There are five ambulance stations located in Kemin, Boom, Chon-Kemin, Boroldoy, and Orlovka. There is also a shortage of healthcare workers in the Kemin district. The district also has limitations due to the small population, which means that they do not receive significant funding and only have the minimum necessary equipment.

The hospital in Kemin district can only provide primary care. For more specialized services people need to be transferred to a larger hospital. From the Project area, the nearest hospital is located approximately 35 km away. It has a general surgical department and provides first aid services and provide assistance in an emergency. The hospital often deals with road traffic accidents, which are quite frequent. They treat a lot of head injuries, bone fractures, and polytrauma cases. They also handle regular cases of acute appendicitis.

97 Healthcare - Official Statistics - Statistics of the Kyrgyz Republic

Health services across the surveyed ayil communities vary in availability and type. The most commonly available service is paramedics and midwife stations. [98] There is a paramedic and midwife station in each ayil of the Kok-Moynok. There are six healthcare establishments in the Kyzyl-Oktyabr ayil okmotu, including a family practice group, a paramedic and a midwife station[99].

In Cholok ayil, residents have access to a family doctor who treats them when needed, and they are generally satisfied. In Kyz-Kiya there is one PMS. The healthcare services are inadequate. Basic treatments such as injections are available locally, but more complex care, such as IV drips, requires a trip to Kemin. The Kok-Moynok 1 ayil has a new, well-equipped health post (FAP) with a competent nurse. Locally, healthcare is seen as good and accessible. Kok-Moynok-2's facilities are older and smaller, a barrack-style building, but it was partially renovated in 2025. Both stations are well-equipped with essential tools, medicines, and even oxygen concentrators. According to survey results there are no clinics or doctors available in Kyz-Kiya or Orlovka. Table 36 below provides information about the availability of healthcare services across the local communities.

Table 36: Access to healthcare facilities by ayil

Surveyed zone	Hospitals	Doctor	Clinic	Paramedic/midwife station
Balykchy	✓	✓	✓	✓
Boroldoy		✓	✓	✓
Cholok				✓
Dorozhniy		✓		✓
Jil-Aryk		✓		✓
Kemin	✓	✓	✓	✓
Kichi-Kemin		✓		✓
Kok-Moynok 1		✓		✓
Kok-Moynok 2		✓		✓
Kyz-Kiya				✓

[98] Kok-Moynok ayil okmotu passport

[99] The paramedic and midwife station represent the closest medical unit for rural residents, offering a convenient source of medical care. It forms part of a larger network of medical outpatient clinics, nursing hospitals, and local hospitals.

Surveyed zone	Hospitals	Doctor	Clinic	Paramedic/midwife station
Kyzyl-Oktabr		✓		✓
Orlovka				
Other (households along the OHTL)		✓		✓
Sovetskoye		✓		✓
Total	2	11	3	13

In all surveyed communities, healthcare facilities and services are generally located within 0.05-1 km (57.6%) or 1-5 km (22%) from households. Residents of Balykchy city reported that the nearest hospital is 24 km away.

Most people in the AOI reach health services by foot (58%), where the distance is greater, they use their own car (32%) or local taxis (5%). The majority of survey respondents stated that it takes them up to ten minutes (62%) or up to 20 minutes (22%) to reach the nearest healthcare facility.

More than half of the respondents (54%) rated the healthcare services as good or very good (10.7%). Less than one third (30%) considered them “average”. Higher levels of satisfaction were mostly reported by residents of Kok-Moynok 1, Kok-Moynok 2 and Kyzyl-Oktyabr.

4.5.20 Community health

The primary health concerns in the Kyrgyz Republic are non-communicable diseases (NCDs). In Kyrgyz Republic, cardiovascular diseases are the leading health issue. Conditions such as heart attacks, strokes, and high blood pressure are prevalent. These are often linked to factors such as elevated blood sugar, high stress levels, poor diet, and other contributing lifestyle factors.

According to representatives of Health departments in Balykchy city and Kemin district, cardiovascular diseases, respiratory illnesses and hypertension are the leading health concerns at a regional level. Seasonal patterns also affect public health, with an increase in viral respiratory infections during the autumn and winter months.

Acute respiratory diseases (influenza, colds), cardiovascular (heart) diseases, anemia, gastrointestinal diseases (gastritis, cirrhosis, peptic ulcer), endocrine diseases were most frequently mentioned among respondents when asked about the common illnesses among household members.

The Kok-Moynok 2 FGD reported an incident that occurred during the construction of an existing OHTL in the area. A boy was electrocuted—suffering burns over 70% of his body—after throwing something at the power line. The community is concerned that a similar incident could occur again.

4.5.21 Agriculture and natural resources

In the Kyrgyz Republic, much of the land is either agricultural or mountainous. Agriculture is a significant sector of the economy. According to the CIA World Factbook[100], it represents 18% of the total GDP and occupies over 40% of the total labor force. Only 6.8% of the total land area is used for crop cultivation, but 44% of the land is used as pasture for livestock. Because of the mountainous nature of the Kyrgyz Republic, animal husbandry remains a significant part of the agricultural economy.

Agriculture provided 27% of the GRP of Issyk-Kul Region, with significant outputs in fruit farming, livestock, and fishing.[101] Agriculture, forestry, and fisheries remain the backbone of the Chui Region's economy. The region produces essential crops such as wheat, sugar beets, and vegetables, alongside significant dairy and meat outputs.

Kemin District is known for its mountainous terrain and fertile valleys, making it an important centre for both agriculture and livestock breeding. In 2023, the district produced 6.3 billion KGS worth of agricultural products, focusing on potatoes, barley, and hay production, which are well-suited to its high-altitude environment. Livestock farming, particularly sheep and cattle, also plays a significant role in the district's economy. The district's agricultural output represented 7.2% of the region's total.[102]

As mentioned previously, Ton District plays a critical role in the agricultural sectors of the region. The district produced 6.3 billion KGS worth of agricultural products in 2023, representing 11.2% of the region's agricultural output.

In the Project AOI, most land is rocky, mountainous and largely unproductive, with some plots used for forestry and horticulture - mainly for growing apples, apricots and blackcurrants. Herding and fishing are also common livelihood activities. During the site visit, several herder's houses and stables were identified, and consultations with local herders confirmed that grazing is practiced widely, particularly in Kemin district.

In the surveyed households, 57% of people own cattle, 45% own sheep or goats, 17% own horses, and 76% own livestock or poultry. Moreover, 58% of surveyed households own farms or additional land plots. Those who have land plots stated that their land is up to 2 ha (54.8%), or 2.1-5 ha

[100] https://www.cia.gov/library/publications/the-world-factbook/geos/kg.html

[101] https://www.adb.org/projects/55250-001/main

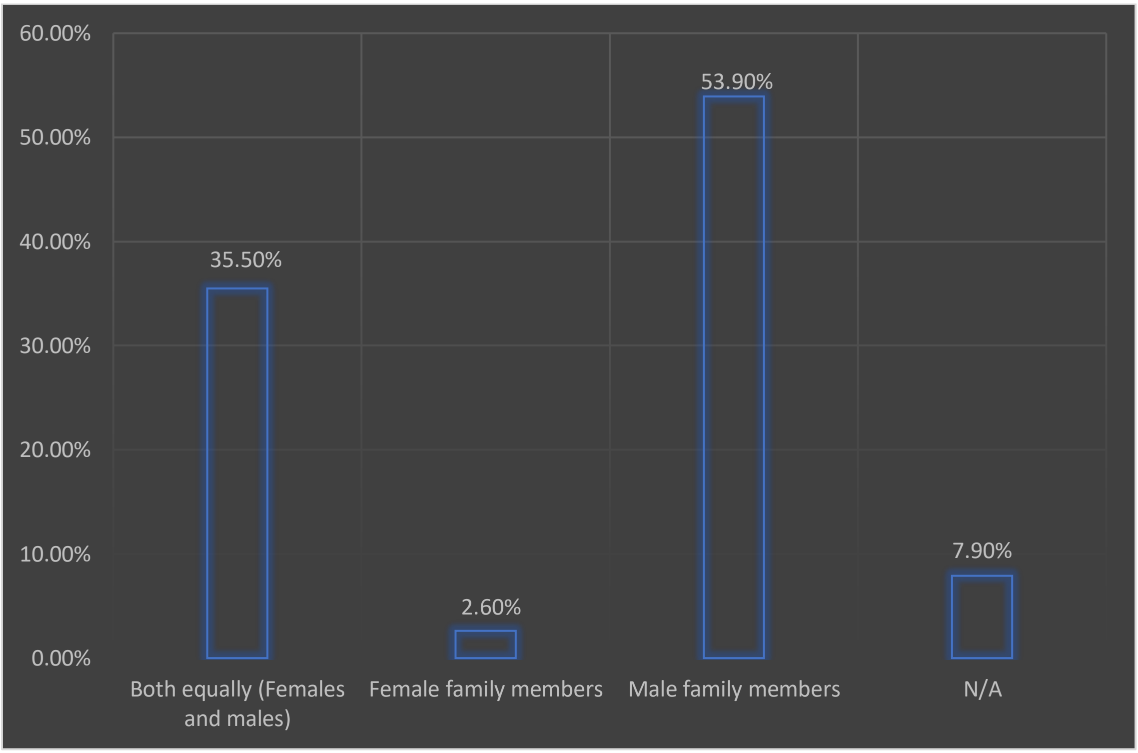
[102] https://akipress.com/news:691499

(41.1%). Almost half of the surveyed households use the land for forage crops. Potatoes, other vegetables, fruit trees, and grapes were also among the frequent responses.

Approximately 17% of the households use their land throughout the entire year. Seasonal usage is much more common, especially in spring, summer and autumn (27,4%). Some respondents said that they use their land seasonally in spring (18.4%), in spring and autumn (13.1%), or only in autumn (6.6%).

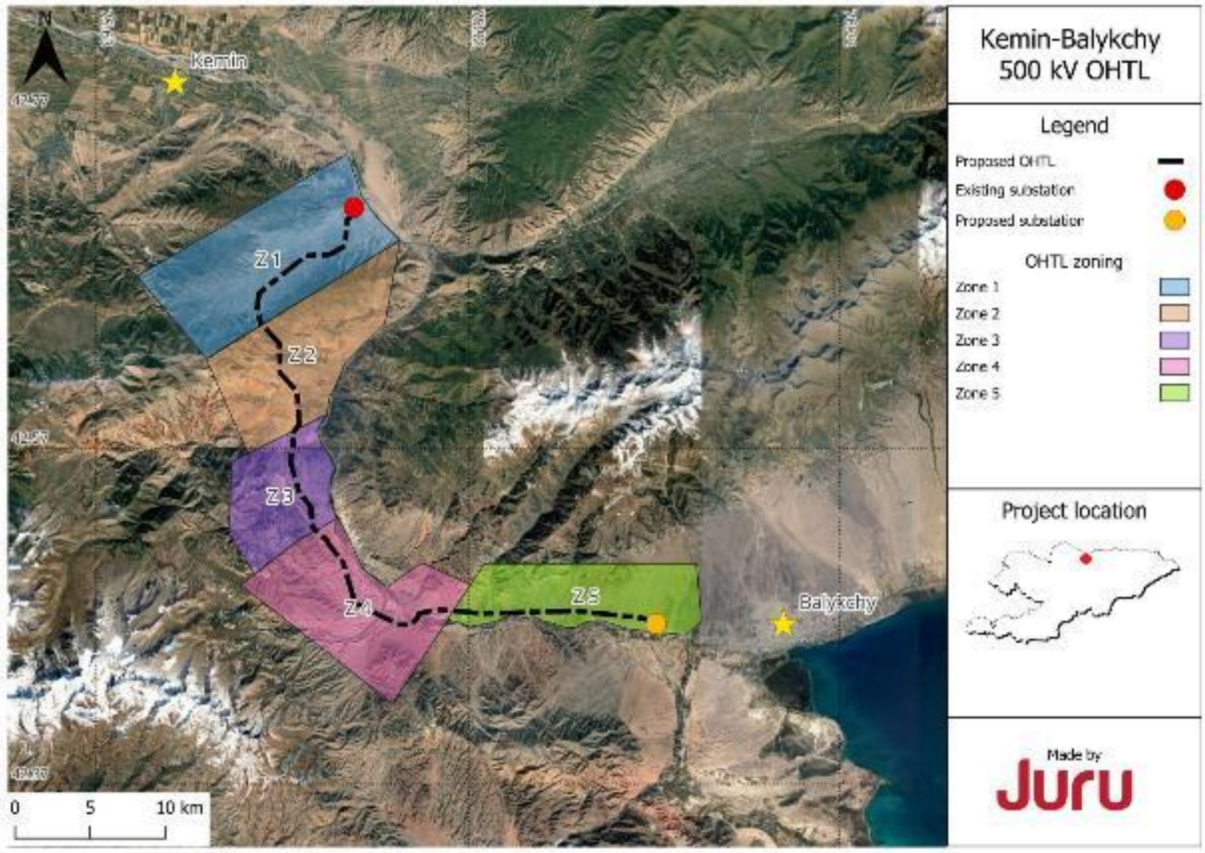
The majority of survey respondents (77.6%) are engaged in agricultural activities mainly to meet household needs, while only 15.8% farm for income purposes. Mostly adult family members (36.8%) work on the farm, some surveyed households said that children also help them (12%), and in some cases they hire workers to assist adult family members (26.4%). In 16% of cases hired workers are the main labor source in farming activities. When asked who is mostly involved in farming activities, 54% of respondents said that male family members primarily work in farms. 33% noted that both men and women participate in farming activities equally, as shown in Figure 77 below.

Figure 77: Farming involvement by gender in the AOI



Survey respondents were asked if they use the land under the RoW shown in Figure 78 below.

Figure 78: Zoning layout of the RoW Area (Zones 1-5)



A total of 51% of respondents reported using the land, mainly for grazing (61%), cultural and recreational (6%), and farming, fishing (4.5%) purposes or simply to pass through (19%). Table 37 shows the distribution of land use for grazing. According to the survey data, zones 1 and 2 are used by the most communities. Zone 4 is only used by members of Kok-Moynok 2, who graze all of the zones except zone 5.

Table 37: Grazing use of RoW Zones by ayil

Settlement/village/Micro district/Ayil	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Balykchy					✓
Boroldoy			✓		
Cholok	✓	✓			
Dorozhniy	✓				

Settlement/village/Micro district/Ayil	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Jil-Aryk	✓				
Kok-Moynok 1					✓
Kok-Moynok 2	✓	✓	✓	✓	
Kyz-Kiya		✓			
Kyzyl-Oktabr	✓				
Orlovka		✓	✓		
Other (households along the OHTL)	✓	✓			
Sovetskoye			✓		
Total number of ayils	6	5	4	1	2

Of the respondents who reported using the land under the RoW, most stated that they use it seasonally (37.3%), daily (32.8%) or once per month (10.4%).

In Cholok they raise ostriches and grow melons. There are 15 households in the ayil and all of them have livestock. But they are mainly engaged in trade. Livestock herding is their secondary livelihood. They graze livestock from 6–7 a.m. until 7–8 p.m., year-round in areas that fall within the RoW of the Project. Sometimes livestock stays overnight in the fields or mountains. There are also seasonal grazing routes, mostly from April until November, that are located within the RoW. The community head confirmed that there are no available alternative grazing areas.

In Kyz-Kiya the land under the RoW is not regularly used or considered a key grazing area. However, there are some herders whose allocated land includes the land under the RoW. Most of the residents own livestock, but they mainly work at the railway. Livestock herding is a secondary livelihood. In winter, livestock is kept tied at home. From April to autumn, livestock is grazed outside. There are also seasonal grazing routes mostly from April till November, some of which fall within the Project RoW. The community head confirmed there is no alternative grazing land available.

In Kok-Moynok 1 all of the 164 households graze livestock under the Project RoW. There are also active grazing routes, especially traditional routes to Kashka-Suu, that pass under the RoW and are used throughout the year. There are 706 cows, 303 horses, 2,579 sheep and 233 goats that are grazed in the area. The livestock is grazed according to a rotating schedule. The community head stated that there is no alternative grazing available. In addition, some residents collect medicinal herbs, such as sea buckthorn, in the area, but it is not widespread.

In Kok-Moynok 2 100 out of 116 households depend on herding for their livelihoods. Residents use the land for grazing and collecting plants for fodder, some residents also grow apples, apricots, and blackcurrants, which may reach heights that could violate required electrical clearance standards. Livestock is grazed in the Project RoW year-round, 24/7. There are 1,190 cows, 662 horses, 3,750 sheep, and 150 goats. The livestock is grazed according to a rotating schedule. There are also seasonal grazing routes that are mostly used from May to November. The community head stated that there are no available alternative grazing areas.

4.5.22 Pasture committees

Until recently grazing in the AOI communities was managed by pasture committees. These pasture committees allowed people to use the land for a period of between one and three years. Residents paid per animal (e.g., 16 KGS per sheep, and 78 KGS per horse) through contracts. Rates were based on pasture committee recommendations, approved by the local council.

The pasture committees have now been dissolved, and a position has been created for a pasture specialist in each ayil okmotu. Land is divided into each ayil okmotu and mayor's office, and the management of pastures in those areas is carried out by a pasture specialist.

Temporary use of those lands is also allocated to pasture users for a period of one to three years. Contracts are concluded directly with herders. The local council in each municipality sets tax payments for the use of pastureland separately for each head of livestock.

This change in pasture management has caused some confusion for AOI community members and they are not clear who is responsible for land use and related payments.

Survey respondents confirmed the payments that they make for temporary land use. Methods of payment varied significantly: some paid a lump sum per year of between 1,000 and 10,000 KGS (11.4%) 5000-10000 KGS (14.3%), 10,000 KGS, some paid per hectare (e.g. 350 KGS per hectare), and some were calculated per head of the livestock.

4.5.23 Accommodation, Living Conditions and Household Amenities.

There are 26 guest houses in Balykchy city. Two hotels are currently operating. One hotel with 106 rooms is under construction and another is being renovated and expected to be completed by spring. While the city’s hotels have a tourist focus, the mayor of Balykchy has stated that there is sufficient accommodation to support a construction workforce if needed. Specific hotels can be allocated to workers, so that they do not interfere with tourism. If works are undertaken during the tourism off season, there will be minimal impacts on tourists. There are also parts of the city that are designated tourist zones, and if workers are housed in different micro districts of the city, it will limit contact between tourists and workers. City security and safety is being improved through supplementing the existing security camera coverage, with the addition of 30 new security cameras.

There are no hotels in Kemin city. Private houses and apartment buildings (most likely in Orlovka – approximately 15 minutes from Kemin) are available for rent and can accommodate workers. There is currently a lot of construction in the area and accommodation for only approximately 50 to 100 people would be available.

Additionally, school dormitories in Boroldoy ayil (approximately 17 minutes from Kemin City) can provide accommodation for around 200-300 people, but would require renovation prior to their use. Kemin city does not have a lot of tourists, so any accommodation of workers will not have an impact on tourism.

The majority of surveyed households (91%) live in private houses, while only 9.2% reside in flats within multi-story apartment buildings. Regarding ownership status, most families (88.5%) live-in privately-owned apartments or houses. A small share (6.1%) reported living in houses provided by work, and 5.3% live in rented houses or apartments as shown in Table 38 below.

Table 38: Housing ownership among surveyed households by ayil

Settlement/village/micro district/ayil	Allocated housing by work	Private house/apartment	Rented house/apartment	Total
Balykchy	6%	89%	6%	100%
Boroldoy		100%		100%
Cholok	29%	57%	14%	100%
Dorozhniy		83%	17%	100%
Jil-Aryk		83%	17%	100%
Kemin		89%	11%	100%
Kichi-Kemin		100%		100%
Kok-Moynok 1	8%	92%		100%
Kok-Moynok 2	21%	79%		100%
Kyz-Kiya		100%		100%
Kyzyl-Oktyabr		93%	7%	100%
Orlovka		100%		100%

Settlement/village/micro district/ayil	Allocated housing by work	Private house/apartment	Rented house/apartment	Total
Other (households along the OHTL)		89%	11%	100%
Sovetskoye		100%		100%
Total	6%	89%	5%	100%

In Kok-Moynok 2 FGD respondents stated that there is a lack of housing for young people, and that overcrowding is an issue—several families often have to live in one house.

In 81.7% cases, houses are owned by men, only 17.6% owned by women. In 0.8% of cases, ownership is shared by both male and female household members. A total of 95% of households reported that they live in their houses all year-around. However, in Orlovka (66.7% of households in the ayil), Sovetskoye (33.3% of households in the ayil) and some households along the OHTL (22.2% of households) reported living in their current houses only for several months. They said that they own their other houses in Bishkek, Kemin district, Orlovka and Tokmok cities.

Table 39 provides information about the main household assets. Almost all surveyed households own a mobile phone (98.5%) and a TV (92.4%). The majority also have washing machines (90%) refrigerators (88%), and more than (68.7%) two-thirds own a car. However, we can see that most households do not have access to the internet (only 30% reported access to it). Similarly, ownership of personal computers, motorbikes and greenhouses (17.6%, 5% and 0.8% respectively) is also relatively low among the surveyed households.

Table 39: Main household assets of the respondents

Asset	Yes (%)	No (%)
Car	68.7	31.3
TV	92.4	7.6
Refrigerator	88.5	11.5
Greenhouse	0.8	99.2
Motorbike	5.3	94.7
Internet connection	30.5	69.5
Personal computer	17.6	82.4

Asset	Yes (%)	No (%)
Mobile phone	98.5	1.5
Satellite dish	37.4	62.6
Washing machine	90.1	9.9

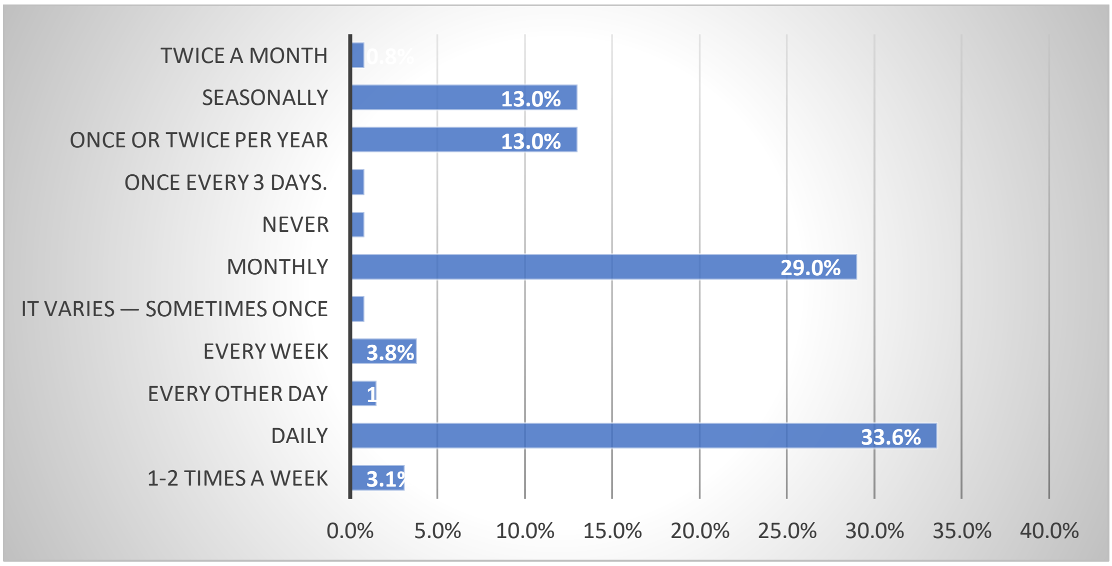
4.5.24 Infrastructure and services

The Study area has key infrastructure supporting the regional economy, including local transmission lines and the Chu River. Balykchy city, Ton and Kemin districts are linked to other regions of the Kyrgyz Republic via the main EM11 highway, the road along which the OHTL route follows. The EM11 highway plays a crucial role in facilitating local and regional travel as well as movement of goods and people. Furthermore, the Bishkek-Balykchy railway, enabling access to the western shores of the Issyk-Kul Lake, plays important role in regional connectivity, although the railway mainly operates in the summer months.

Balykchy city's strategic location, with a railway passing through, facilitates export and import, and routes as Toragar-China, Bedel through Balykchy, and the Osh-Balykchy route all pass through the city. Balykchy serves as a major transportation hub. The Balykchy railway connects Kyrgyz Republic to Uzbekistan and Russia.

Within the scope of the ESIA survey, respondents were asked about how often they use the EM11 highway, one third of the respondents reported using it daily, 29% of surveyed households used it monthly, the remaining surveyed households used the road seasonally (13%) or once, twice per year (13%) as shown in the figure below. Most of the people who use the road on daily basis are the residents of Kok-Moynok 1, Kok-Moynok 2, Cholok and Dorozhniy.

Figure 79: Frequency of using the EM11 road by surveyed households in the AOI.



Survey results show that there are no alternative roads to use, or they are very inconvenient to use. About 95% of respondents stated that there are no alternative roads available for use. The remaining 5% mentioned a few alternatives, including bypassing routes (2.3%), the Balykchy-Jalalabad Road (0.8%), a road that crosses a bridge towards Balykchy (0.8%) and mountain paths (0.8%).

When it comes to the gravel road in the northern section of the proposed OHTL, near the Kemin substation, the survey results suggest that while the road may hold some local importance, especially to members of Cholok village, and Kyzyl-Oktyabr its overall usage among the surveyed communities is relatively low (71% of respondents stated that they have never used it).

Respondents were also asked about the roads that cross the Project RoW. Around 14% of surveyed households said they do not use these roads, and 18.3% reported using them daily. Others stated they use them once or twice per month (20.6%), only in some seasons (18.3%) or once or twice every year (26.7%). Only 7.6% noted that there are alternative roads available that could be used instead.

Table 40presents data on access to centralized gas and water supply, heating, and sewage systems across all communities. Survey results revealed that none of the communities have access to centralized gas supply (0%) and very few have access to central heating (only 1% - in Orlovka). For cooking, most households use electricity (51%) or gas cylinders (41%). When it comes to heating, the majority of households rely on coal (86%), dry manure (9%), electricity (3%) and wood or plant materials (2%).

Table 40: Percentage of the population that has access to the main household utilities in the AOI

Surveyed zone	Central sewage system	Central Heating system	Centralized gas supply	Centralized water supply
Balykchy	22.2%			77.8%
Boroldoy				100%
Cholok				14.3%
Dorozhniy				83.3%
Jil-Aryk				66.7%
Kemin				55.6%
Kichi-Kemin				100%
Kok-Moynok 1				54.2%
Kok-Moynok 2				50%
Kyz-Kiya				
Kyzyl-Oktabr				46.7%
Orlovka	33.3%	33.3%		66.7%
Other (households along the OHTL)				

Surveyed zone	Central sewage system	Central Heating system	Centralized gas supply	Centralized water supply
Sovetskoye				66.7%
Percentage connection in the AOI	3.9%	0.8%	0%	55%

A total of 55% of surveyed households reported having access to the centralized water supply, while an additional 1.5% state that they have access to it but noted it does not function properly. Where water supply is not available, households get the water for drinking, cooking and for other domestic needs from pumps located in their own or neighbors' yards, private groundwater wells or natural springs. In a few cases water is sourced from ditches, drainage channels or collectors.

There is no central sewage in most surveyed local communities. In Dorozhniy, Jil-Aryk, Kemin (each 100%), Balykchy (94%) and Kyzyl-Oktyabr (87%) and partly in Cholok (71%), Kok-Moynok 1 (41.7%), Kok-Moynok 2 (28.6%), Kyz – Kiya (60%), Orlovka (33.3%) waste is taken by State waste disposal company (56% of the total surveyed population). In Kok-Moynok 1 (58%) and Kok-Moynok 2 (64%) most households said that they dispose of waste in pits special for waste in their yards (this is also the case for 31% of the surveyed households). Burning (8.5%) or transporting waste to collection points (0.8%), using the services of private waste companies (0.8%) are also the other methods of managing the garbage.

According to the survey results, electricity supply is more reliable than gas and water in the study area. Nearly 62% respondents stated that electricity supply is stable all year round, 28% of respondents, mostly in Kemin, Kok-Moynok 1, Kyzyl-Oktyabr, and Cholok said that power outages occur in the winter and summer seasons. Alternative energy use remains low, but some surveyed households (3.8%) said that they use solar panels for electricity.

FGD respondents from Cholok stated that the main problems their communities faced were water and electricity. There is a shortage of both irrigation and drinking water and there are frequent power outages, especially during bad weather and strong winds. The electricity infrastructure (wires) is old and in poor condition.

4.5.25 Tourism

Issyk Kul lake is a tourism location that brings tourists from Kyrgyz Republic and other nearby countries including Uzbekistan, Turkmenistan, and Russia. It is popular during the summer months when tourists come to stay by the lake. The area is promoting other forms of tourism, such as eco-tourism, medical tourism and sports tourism. The lake's salty water is beneficial for health, making it an ideal setting for active tourism. Communities around the lake and along the EM11 highway, which is a main access route to reach the lake, benefit from the influx of tourists during the on-season. Many tourists also arrive by rail. In 2024, a promenade was constructed along the beach that attracted between 3,000 to 5,000 tourists per day.

The high season for tourism in Kemin begins in early June, coinciding with the start of kymyz (national drink from horse milk) therapy. Many tourists pass through Kemin on their way to Issyk Kul Lake. An estimated 100,000 people visit Kemin district each year.

Closer to the Project site there are canyons called the Mykachyngyn Unkuru canyons that are close to the communities of Kok-Moynok 1 and Kok-Moynok 2. The Project OHTL will cross these canyons. They are natural structures that people visit to hike, take photographs and picnic as well as being part of a geo tourism route. According to community heads, the canyons are drawing increasing attention from visitors. The site currently attracts around 5,000 to 6,000 visitors per season. June, July, and August are peak months. Local communities are investing in them by constructing a 2 km access road to the site. Local shopkeepers gain customers from the tourists visiting the canyon.

Previously, the canyon was part of the Kok-Moynok ayil okmotu in Ton District but was underutilized. In 2024 the canyon was annexed to the jurisdiction of Balykchy city under Order N370, which transferred 121,686 hectares of land to the city. The canyons do not currently generate municipal revenue and business activity is not allowed in the canyons by the government.

Balykchy city included the area in its development plans and is awaiting the necessary funding for further development. Balykchy city is also currently drafting a cost estimate for building a bridge near the canyon to boost tourism. This initiative is expected to create new jobs and significantly improve living conditions, making it a mutually beneficial development for both the municipality and local residents.

4.5.26 Language and ethnicity

In Kyrgyz Republic, approximately 74% of the population is ethnic Kyrgyz, 14.8% are Uzbeks, 4% are Russians and other minority ethnic groups include Dungans, Uyghurs, Tajiks and Kazakhs (each comprising about 1%) as well as smaller populations of Koreans, Chinese, Ukrainians Germans and others. The state language is Kyrgyz. However, according to the Law of 2000 "On the Official Language of the Kyrgyz Republic", Russian is also recognized as a second official language in the country. It is used alongside the state language in public administration, legislation and legal proceedings, and other areas of public life.

In Kemin district, 91% of the population are Kyrgyz, 6,2% are Russian, 1% are Kazakh. A small number of people belong to over other 20 nationalities including, Ukrainians, Byelorussians, Uzbeks, Dungans, Azerbaijanis.

According to the passport of the Kok-Moynok ayil Okmotu, the populations of Kok-Moynok 1 and Kok-Moynok 2 are entirely Kyrgyz. Most residents are reported speak Kyrgyz as a first language, but that they also understand and speak both Uzbek and Russian.

The statistics provided by the Kyzyl-Oktyabr ayil okmotu, the ethnic composition and language profile is slightly different from that of Kok-Moynok. Approximately 95% of its population identify as Kyrgyz, 3% as Russian, approximately 0.2% as Uzbek and 1.6% (102 people) belong to 27 different nationalities, including Tajiks, Kazakhs, Uyghurs, Turks, Kurds, Ukrainians, Belarussians, and others.[103] However, the head of Kyzyl-Oktyabr ayil okmotu reported that, as of April, 2025, the population of Kyz-Kiya and Cholok ayils are entirely Kyrgyz.

Among the surveyed individuals, 96.2% were Kyrgyz, 4 (or 3%) identified as members of other Central Asian ethnicities (Kazakh, Tajik, Turkmen, or Uzbek) and one respondent (0.8%) belonged to a Slavic ethnic group, most likely Russian.

4.5.27 Indigenous peoples

During the site visit and subsequent communications with the nearest communities, no ethnic minorities or indigenous people (IPs) as identified in the EBRD PR7 were observed or identified. Heads of AOI ayils also confirmed in the meetings, that there are not any indigenous people in these areas. Consequently, it can be confirmed that IPs are not present in the AOI.

4.5.28 Poor and vulnerable groups

According to the Asian Development Bank (ADB), as of 2023, 29.8% of the population in the Kyrgyz Republic lived below the national poverty line - the minimum income needed to meet basic living standards including food, clothing and shelter, based on local prices and conditions. In comparison, poverty rates are significantly lower in neighboring countries: Kazakhstan - 5.2%, Tajikistan – 22.5%, Uzbekistan – 8.9%.

In 2024, 0.3% of working people in the Kyrgyz Republic earned less than USD $2.15 a day, measured in purchasing power parity (PPP).[104] – internationally comparable standard that reflects what USD $2.15 would buy, adjusted for local prices. For comparison, the same figure was 0.1% in Kazakhstan, 1.1% in Uzbekistan, 2.1% in Tajikistan.

There is no single normative legal act which defines all categories of vulnerable people in the Kyrgyz Republic. The law of the Kyrgyz Republic “On State Benefits[105]” defines those eligible for state social benefits. According to the law, these include:

1. Children with disabilities (under the age of 18);
2. People living with disabilities since childhood (groups I, II, III);
3. People living with disabilities (groups I, II, III);
4. Elderly citizens: Men (65 and over), Women (60 and over);

[103] Kyzyl-Oktyabr ayil okmotu passport.

[104] https://www.adb.org/mobile/basic-statistics-2025/

[105] The law of Kyrgyz Republic “On State Benefits” available at: https://cbd.minjust.gov.kg/111670/edition/3018/ru

5. Children who lost one parent;
6. Children who lost both parents;
7. Children born to mothers living with HIV/AIDS;
8. Needy families with children under the age of 16;
9. Children with unknown parents, until the age of 16;
10. Citizens, families living in high mountains, remote and border regions from the birth of the third child onward;

According to the law, **needy families** are those whose monthly income per person is below guaranteed minimum income, an amount set annually by the Cabinet of Ministers based on economic conditions and the subsistence minimum.

Families living in difficult conditions are the low-income or poor families whose monthly income per person falls below the poverty line. These families often lack stable sources of income and may face compounded challenges such as unemployment, disability, or having many dependents.

Other legal documents, such as "Law of the Kyrgyz Republic on Legal Aid Guaranteed by the State"[106], includes the women affected by gender-based violence, single persons raising a child/children, victims of human trafficking and others to this list.

EBRD describes vulnerable people as people or groups of people, who may be more adversely affected by Project impacts than others by virtue of characteristics, such as their gender, gender identity, sexual orientation, religion, ethnicity, indigenous status, age (including children, youths, and the elderly), physical and mental disability, literacy, political views, or social status. Vulnerable individuals and/ or groups may also include, but are not limited to, people in vulnerable situations, such as people living below the poverty line, the landless, single- headed households, natural resource dependent communities, migrant workers, refugees, internally displaced people, or other displaced persons who may not be protected through the national legislation and/or public international law.

According to official records included in the passport of Kok-Moynok ayil okmotu, a total of 207 vulnerable individuals were identified. Of these, 152 are people living with disabilities, either due to illness, or due to conditions present since childhood (55 individuals).[107] There are also 386 registered pensioners and 36 unemployed individuals.

[106] https://www.refworld.org/legal/legislation/natlegbod/2022/en/148017

[107] Passport of Kok-Moynok ayil okmotu

According to the data obtained from Kyzyl-Oktyabr ayil okmotu, 156 people living with disabilities live in this area, 57 of them are children under the age of 18 and 20 of them are of working age. There are 21 low-income families, all of them officially classified as “living in difficult conditions”.[108]

In Kichi-Kemin, there are 385 people living with disabilities, including 38 children under the age of 18. There are 152 low-income families in this area, of which four receive poverty benefits, and three are classified as living in particularly difficult conditions.

Among the surveyed households, there are:

- 10 disabled persons, all of them have physical disability. Most of them live in Kok-Moynok-1 (3.1% of the total household members) and Kemin (1.5% of the total household members).
- 13.7% of respondents stated that they receive poverty benefits. One household noted that they should qualify for poverty benefits, but currently they do not receive any.

4.5.29 Cultural heritage

There are two locations in the Kyrgyz Republic that are on the UNESCO World Heritage List. It is not anticipated that the Project will have any impact on either of these locations. The nearest location to the Project site is in Balasagun City (Chui region), approximately 48 km from Kemin substation.[109]

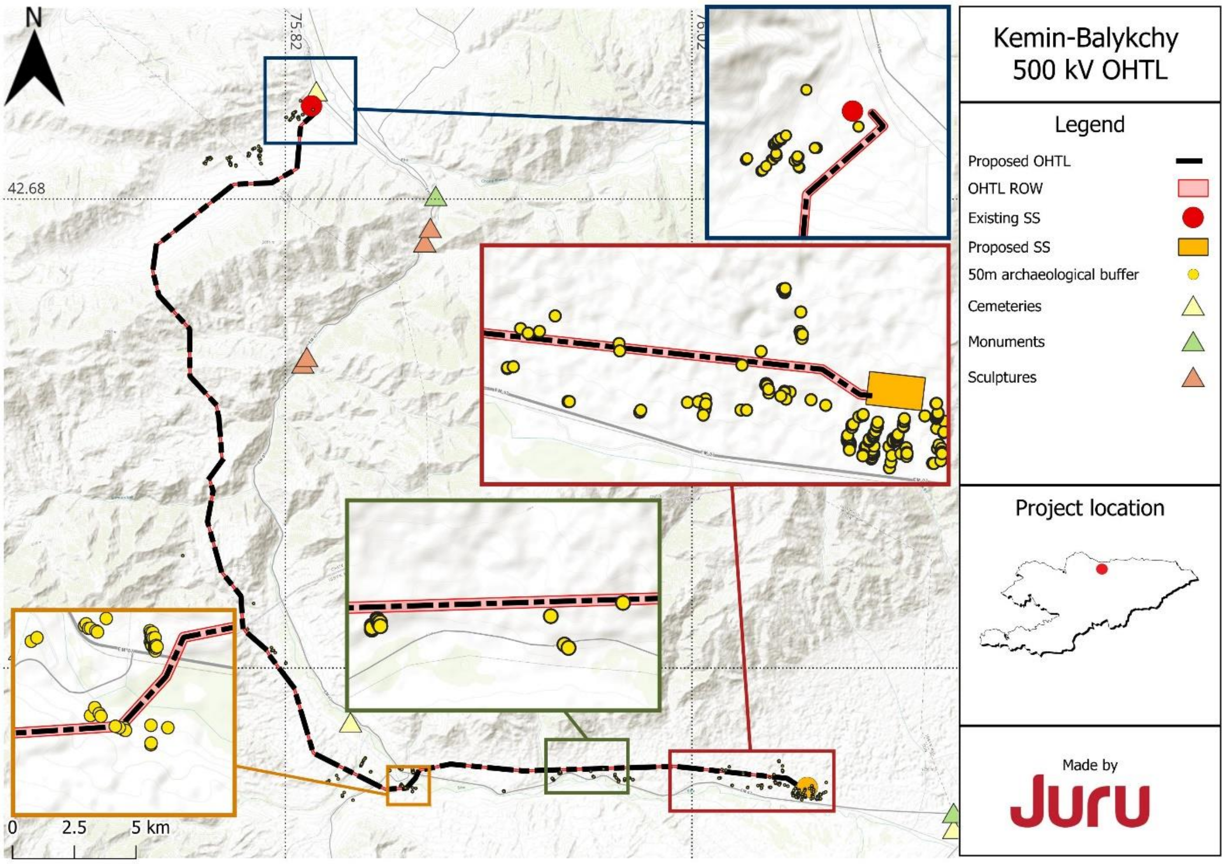
The Project scoping site visit on 13-14 November 2024 revealed the visual presence of cemeteries and monuments within 300-1300 meters of the proposed Project alignment. During the site visit, four cemeteries were identified, two in Balykchy city, one in Kok-Moynok 2 ayil and one in Cholok ayil. Additionally, several single graves, sculptures and statues have been discovered along the EM11 highway. However, none of them is directly impacted by the Project.

Archaeological studies were carried out in 2025, and these studies have found large numbers of kurgans (burial mounds), near to the Balykchy substation and along the OHTL RoW. The Project design has avoided placing project components within archaeological protected zones and maintained a minimum 50m buffer from the archaeological sites. Nevertheless, there are several locations where the OHTL RoW intersects with the protection zones of archaeological sites. The results of the assessment are shown in Figure 80. The intersection points have been zoomed in on the map to facilitate their identification during later stages of planning.

[108] Passport of Kyzyl-Oktyabr ayil okmotu

[109] https://whc.unesco.org/en/statesparties/kg/

Figure 80: Cultural heritage objects[110]



During the socio-economic survey, respondents were asked if they knew about any cultural sites of international, national or local importance located within the Project area, or within a 5 km radius. Approximately 24 % of respondents said that they were aware of such sites, while the rest said they were not. Cultural sites mentioned were the Cultural Centre in Kemin, Cultural house in Kok-Moynok 1, Museum in Balykchy, Kok-Moynok Canyon in Kok-Moynok 2, Konorchok Canyon in Kyzyl-Oktyabr, mosques located in local communities. Further consultations have confirmed that the canyon areas do not hold specific cultural significance, they were mentioned for their natural beauty and touristic importance.

110 Map is required to be updated to reflect the final archaeological report this will be done for the next issue. The findings are reflected in the text.

4.5.30 Cultural objects

The following figures provide examples of cultural objects identified during the Project scoping site visit on 13-14 November 2024.

Figure 82: Cemeteries of Cholok ayil (1300 meters away from the OHTL)

Figure 83: Cemeteries of Balykchy city (350 meters away from the OHTL)

Figure 84: Sculpture (500 meters away from the OHTL)

Figure 85: Grave (1000 meters away from the OHTL)

Figure 86: Sculpture (500 meters away from the OHTL)

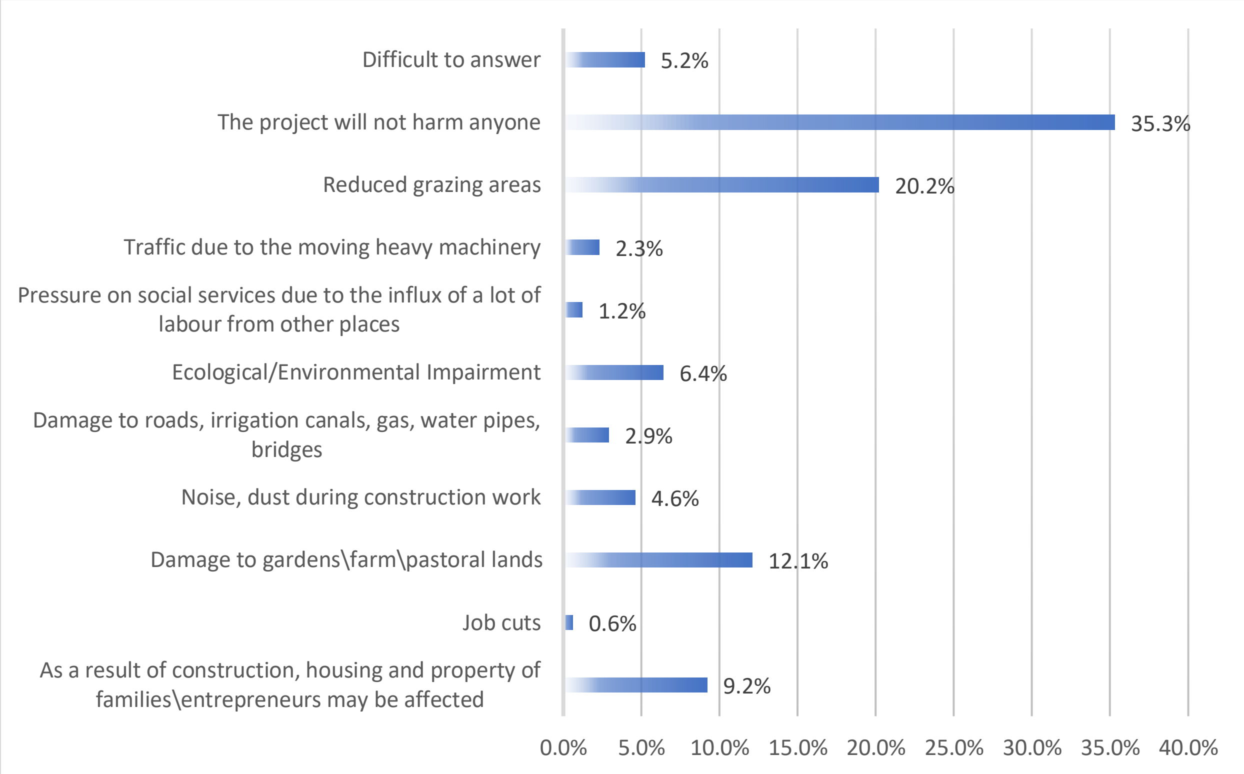
Figure 87: Sculpture (330 meters away from the OHTL)

4.5.31 Knowledge about the Project.

The survey results revealed that a small proportion (16%) of households had already received information about the project. Approximately 10% of them stated that they had heard about it but had limited knowledge. The remaining 73.3% of the surveyed households reported having no information at all about the Project. Respondents stated that they would like to get information about the Project progress from television (33%) or on social networks (30%). Some of them also want to hear about it from local authorities (14%). When asked what positive changes they expect from the Project, the most common responses were improved electricity supply efficiency (31%) and lower electricity prices (26%). Around 16% believed that new job opportunities might be created. A few mentioned that the Project could improve the work of schools, hospitals and other social institutions (6%) or improve the environment (4.2%). Some said that they did not expect any changes (4.2%) or did not have any opinion (2.4%).

As for the possible negative consequences, since most people use these areas for grazing, the biggest concerns were about reduced grazing (20%) and damage to gardens, farms and pastoral lands (12%). Still, in more than one third of the surveyed households, people said that they do not think the Project would cause any harm. Although less mentioned in other communities, in Kichi Kemin all respondents were worried about the possible job losses due to the influx of workers from other countries and regions during the construction phase.

Figure 81: Expected negative impact of the Project according to survey respondents



4.6 Biodiversity baseline

4.6.1 Introduction

Like most of the country, the territory surrounding the site is dominated by mountains, intersected by valleys and gorges. Elevation and topography greatly affect weather conditions, which, in turn, affect habitat and biodiversity along the proposed OHTL routes. Mountain specialist species, such as Snow Leopard *Panthera uncia*, Siberian Ibex *Capra sibirica* and Himalayan Snowcock *Tetraogallus himalayensis* are found in the surrounding high mountains. The biodiversity of the high-altitude desert of the western part of the Issyk Kul Province, which is unique for the country, is represented by some desert species, including several species of sandgrouse, larks, jerboas and specific desert vegetation.

One of the key features within the Project area is the Chu River running parallel to the planned OHTL in the Issyk-Kul region and turns to a narrow Boom Gorge in Kemin, after flowing out of Ortotokoi Reservoir upstream and before entering the populated Chui Valley further north, on its way to Kazakhstan. The river supports a diversity of species, including riparian vegetation, as well as species of fauna that depend on it, including passerine birds, mammals, amphibians, and fish.

Outside the sections of the OHTL crossing the mountains, most of the areas adjacent to the OHTL route options are represented by relatively flat landscapes and are used either for agriculture (orchards, hayfields) or as pastures. Slopes of hills and mountain ranges may be used for grazing as well, where possible, while the steepest slopes and areas with difficult access due to the absence of access roads support largely natural habitats. Habitats along the highway connecting the Issyk-Kul and Naryn Provinces with the Chu Province are substantially disturbed; however, they still support some wildlife more tolerant of human presence. Poaching, overgrazing, wildfires and disturbance from other human activities are among the threats to biodiversity in the region.

The biodiversity baseline characterization for the Project has been developed by a team of national and international biodiversity experts, and is based on a comprehensive review of technical literature, publicly available biodiversity databases, and other sources of "desk-based" information, which served as a basis to a) conduct an initial screening for Critical Habitat (CH) features and Priority Biodiversity Features (PBF), per EBRD PR6, and b) scope a set of biodiversity baseline surveys intended to inform a Critical Habitat Assessment (CHA) and the preparation of the biodiversity baseline and impact assessment chapters of the ESIA. The baseline chapter of this ESIA integrates the desktop review, baseline survey results, and CHA, to characterize the baseline condition of the Project's AOI (which, in the context of the CHA is equivalent to the Ecologically Appropriate Area of Analysis, or EAAA), with a focus on the biodiversity elements that have been identified either as CH features or PBF for the Project.

4.6.2 Protected area

Eight protected areas of national and international importance were identified within a 50 km buffer from the proposed OHTL route (Figure 82). The closest protected area is located only 1 km away from the easternmost endpoint of the proposed OHTL route, followed by 3 protected areas that lie approximately 6.8 km to the east of the eastern end of the OHTL, that largely overlap each other, and with various protection statuses aiming to conserve Lake Issyk-Kul and its biodiversity. These are the KBA "Western Issyk-Kul Lake", the "Issyk-Kul State Nature Reserve", the "Issyk-Kul Biosphere Reserve" and the Ramsar site "Issyk-Kul State Reserve with the Lake Issyk-Kul". The latter three PAs cover the whole area of Lake Issyk-Kul and its shore, while the KBA covers not only the western bay of the lake but also some of the adjacent floodplain and riverine forest. Lake Issyk-Kul itself is an important wintering site for migratory waterbirds, with up to 70,000 birds recorded annually in winter. The lake also has 28 fish species, including 7 endemic species[111].

The KBA "Western Issyk-Kul Lake" was designated as an important wintering site for thousands of migratory birds, including Black-necked Grebe *Podiceps nigricolis*, Red-crested Pochard *Netta rufina* and Whooper Swan *Cygnus cygnus*.[112] Another protected area, which is located 12.5 km to the south of the project site is the "Kochkor" Wildlife Refuge, which was established for the conservation of hunting species of birds in the area located to the west of the Ortotokoi Reservoir. Located close to the mouth of the Chu River, the water surface of this bay rarely freezes in winter, regularly providing shelter to several thousand wintering waterfowl congregating in this part of the reservoir, including Ruddy Shelduck, Red-crested Pochard and Common Pochard *Aythya farina*

111 https://rsis.ramsar.org/ris/1231?language=en

112 https://www.keybiodiversityareas.org/site/factsheet/27414

(IUCN VU). This bay, as well as the adjacent area of the shore, is also used by migrating birds as a stopover site.

There is no overlap between the Project's ROW with any nationally or internationally protected areas. Potential risks to biodiversity of the nearby PAs are expected to be minimal, based on the results of field surveys (please see Impact Assessment for more details).

Figure 82: Protected areas of national and international importance within 50 km buffer around the proposed OHTL route

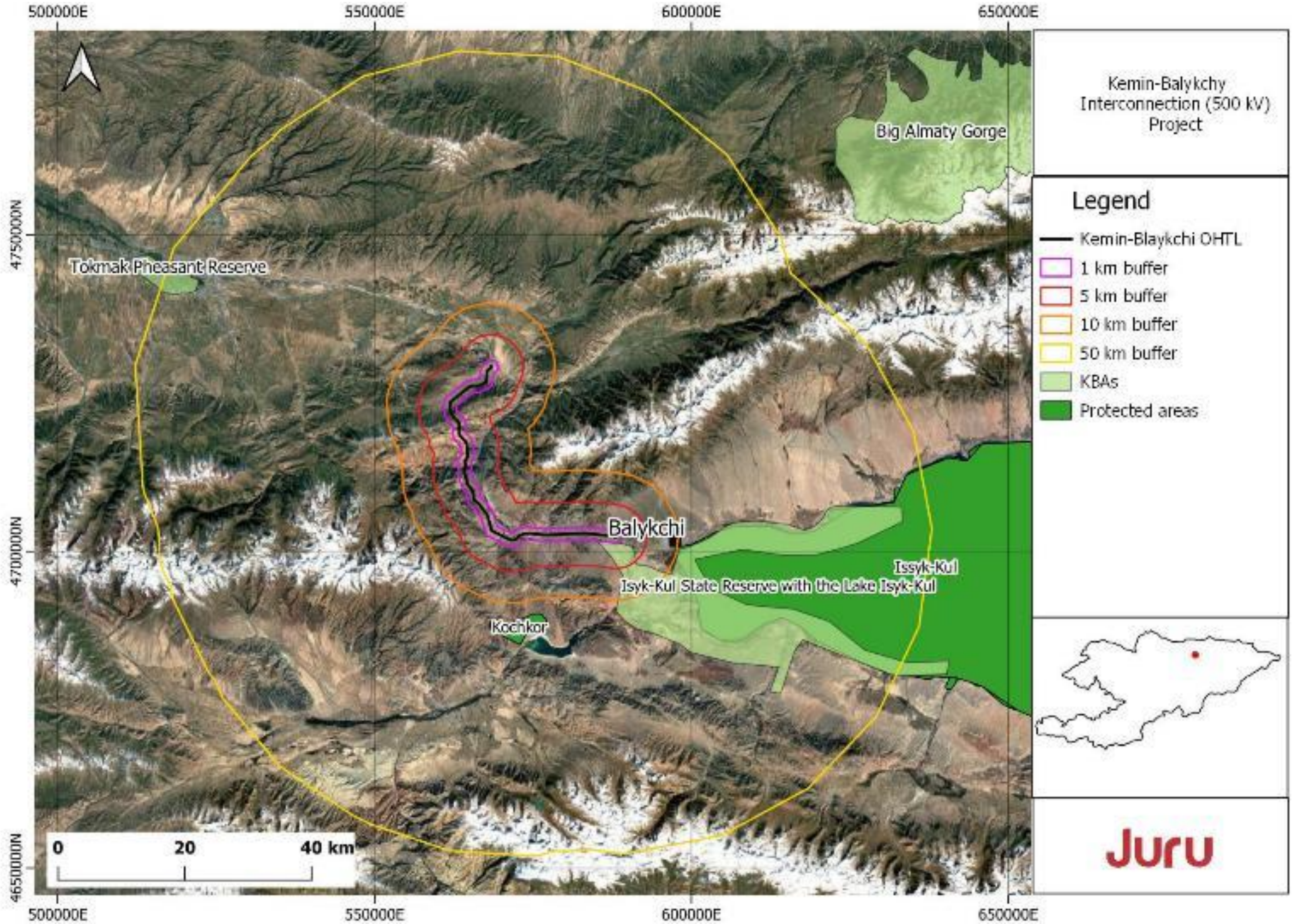


Table 41: Protected areas within a 50 km buffer around the proposed OHTL route

Area name	Distance to the project site	IUCN Category	Status	Designation
Issyk-Kul	9.2 km	Ia	Designated	State Nature Reserve (Ia Category)[113]
State Nature Sanctuary 'Karakonuz Tract' (Kazakhstan)	33 km	IV	Designated	Zakaznik (IV Category)
Kochkor	12.5 km	IV	Designated	Wildlife Refuge (IV Category)
Issyk Kul	9.2 km	Not Applicable	Designated	UNESCO-MAB Biosphere Reserve
Issyk-Kul State Reserve with the Lake Issyk-Kul	9.2 km	Not Reported	Designated	Ramsar Site, Wetland of International Importance
Western Issyk Kul Lake	1 km	Not Applicable	NA	KBA
Tokmak Pheasant Reserve	44 km	Not Applicable	NA	KBA

113 *UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) and World Database on Other Effective Area-based Conservation Measures (WD-OECM) [Online], November 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net*

4.6.3 Flora and habitats

4.6.3.1 Habitat classification

As a result of the autumn field survey and analysis of satellite imagery, 15 habitat types were identified within the defined 500-meter buffer zone along the OHTL corridor (as shown in the study area map) along the planned Kemin-Balykchy OHTL. The habitat types were classified according to recent habitat classification schemes (Table 42), and the habitat classification analysis reveals a complex and ecologically diverse landscape over the approximately 5,355 hectare area analyzed (Table 42). The landscape composition is predominantly natural, with Rocky Outcrop Shrubland and Stony Foothill Arid Steppe being the most extensive habitat types, representing 21.8% and 21.7% of the total area, respectively. These habitats are characteristic of rugged terrain and foothill regions, supporting xeric-adapted shrubs and drought-tolerant grasses. Montane Steppe Grasslands and Rangeland (Mountain) collectively account for 35.7% of the total area and are critical for seasonal livestock grazing, primarily by cattle and sheep, indicating active pastoral land-use. Mid-level contributions come from Montane Xerophytic Shrubland and Alpine Shrub with a combined share of 11.3%, highlighting ecological transitions on arid slopes and subalpine zones. Other ecologically significant habitats include Scree, which are erosion-prone rocky surfaces, and Red Sandstone Desert and Shrubland (1.9% combined), confined to lower elevation benches and arid canyons. Riparian Forest and Riverside Forest comprise 2.8%, representing narrow belts of hygrophilous vegetation along intermittent and perennial watercourses. Anthropogenically modified areas constitute a minimal portion of the area. Urban areas cover 0.4%, while Agricultural Land accounts for just 0.1%, reflecting low-intensity cultivation or abandoned croplands.

Water Bodies are similarly limited (0.4%), primarily comprising small reservoirs or natural ponds. Bare Canyon Cliffs, although representing only 0.1% of the total area, offer high conservation value due to their ecological singularity and potential as microhabitats for endemic or cliff-specialist flora and fauna. This comprehensive habitat structure underscores the region's ecological heterogeneity and gradient of aridity, ranging from high-value montane steppes and shrublands to highly erodible desert and canyon systems.

Table 42: Classification of Project Area (500m buffered OHTL) Habitat Types According to IUCN and EU Habitats Directive Frameworks

Habitat name	IUCN Code	IUCN Habitat Name	EU Habitats Code	EU Habitat Name	IUCN habitat code	Area (hectares)
Rocky outcrop shrubland	7.2.1	Scree, boulders and outcrops	8210	Calcareous rocky slopes	7.2.1 Scree, boulders and outcrops	1167.8

Habitat name	IUCN Code	IUCN Habitat Name	EU Habitats Code	EU Habitat Name	IUCN habitat code	Area (hectares)
Stony foothill arid steppe	4.6	Temperate Grassland - Semi-arid	EUNIS 62B0	Ponto-Sarmatic steppe grasslands	4.6 Temperate Grassland - Semi-arid	1160.4
Montane steppe grasslands	4.4	Temperate Grassland - Alpine	6170	Alpine calcareous grasslands	4.4 Temperate Grassland - Alpine	1034.7
Rangeland (Mountain)	4.5	Temperate Grassland - Montane	6520	Mountain hay meadows	4.5 Temperate Grassland - Montane	877.16
Alpine shrub	13.2	Shrubland - Subalpine/Alpine	4060	Alpine and subalpine dry heaths	13.2 Shrubland - Subalpine/Alpine	325.05
Montane xerophytic shrubland	3.8	Desert Shrubland - Temperate	5330	Thermo-Mediterranean and pre-desert scrub	3.8 Desert Shrubland - Temperate	279.41
Scree slopes	7.2.1	Scree, boulders and outcrops	8211	Calcareous rocky slopes	7.2.1 Scree, boulders and outcrops	170.55
Red Sandstone Desert Grassland	3.7	Desert Grassland - Temperate	EUNIS F6.3	Desert-steppe grassland	3.7 Desert Grassland - Temperate	88.67
Riverside forest	1.4.2	Riparian Forest - Temperate	EUNIS 91E0	Alluvial forests	1.4.2 Riparian Forest - Temperate	76.9
Riparian Forest	1.4.2	Riparian Forest - Temperate	EUNIS 91E0	Alluvial forests	1.4.2 Riparian Forest - Temperate	71.67
Urban area	14.4	Urban Areas	EUNIS J1	Urban fabric	14.4 Urban Areas	23.17
Water body	5.1	Permanent Rivers/Streams/Creeks	3260	Water courses of plain to montane	5.1 Permanent Rivers/Streams/Creeks	21.52
Red Sandstone Desert Shrubland	3.8	Desert Shrubland - Temperate	EUNIS F6.3	Desert-steppe grassland	3.8 Desert Shrubland - Temperate	13.98

Habitat name	IUCN Code	IUCN Habitat Name	EU Habitats Code	EU Habitat Name	IUCN habitat code	Area (hectares)
Bare Canyon Cliff	7.2.1	Scree, boulders and outcrops	8210	Calcareous rocky slopes	7.2.1 Scree, boulders and outcrops	7.56
Agricultural Land	14.2.1	Arable Land	EUNIS I1.1	Arable land	14.2.1 Arable Land	7.15

A more detailed habitat classification was conducted within a narrower area, defined as the 30-meter Right-of-Way (ROW) along either side of the outermost OHTL conductor, resulting in a total corridor width of approximately 60 meters (Table 43). This ROW spans 338 hectares and represents the area most directly affected by vegetation clearance, edge disturbance, and maintenance activities. Habitat mapping shows that the ROW traverses predominantly natural terrain, with Rocky Outcrop Shrubland (21.3%), Stony Foothill Arid Steppe (21.0%), Montane Steppe Grasslands (17.9%), and Rangeland (Mountain) (16.6%) being the most extensive habitat types. These land covers are characteristic of the regional foothill and montane zones. Smaller proportions of Montane Xerophytic Shrubland, Alpine Shrub, and Scree Slopes reflect localized topographic and climatic variation. Anthropogenically modified areas such as Urban Area (0.2%) and Water Body (0.1%), occupy very limited portions of the ROW. Overall, the corridor remains largely natural in composition. A summary table of land cover percentages within the ROW is provided below, followed by detailed habitat maps of the OHTL ROW. A detailed description of each habitat type is provided further below.

Table 43: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor

Habitat name	Area in hectare
Alpine shrub	20.83533
Bare Canyon Cliff	0.227855
Montane Steppe Grasslands	60.46201
Montane Xerophytic Shrubland	16.454496
Rangeland (Mountain)	56.144414
Red Sandstone Desert Grassland	3.763119
Riparian Forest	3.733367
Riverside forest	2.853707
Rocky Outcrop Shrubland	72.135337
Scree Slopes	8.585852
Stony foothill arid steppe	71.00458
Urban area	0.529975
Water body	0.477093

Figure 83: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (1-5 km of OHTL line)

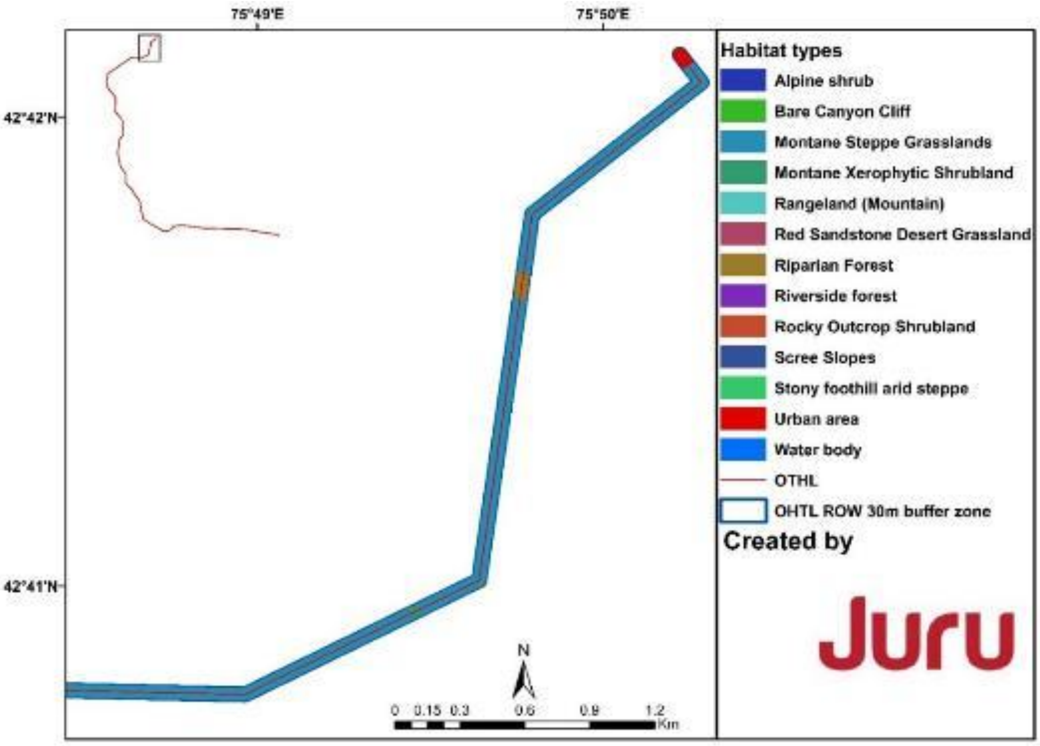


Figure 84: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (5-9 km of OHTL line)

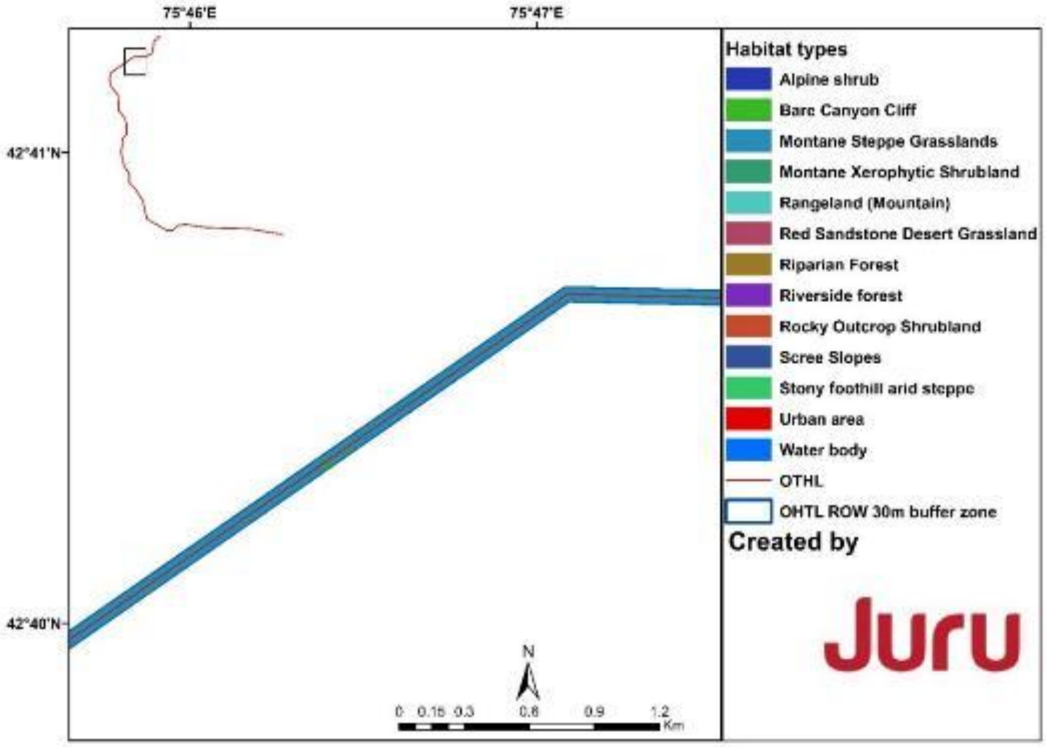


Figure 85: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (9-13 km of OHTL line)

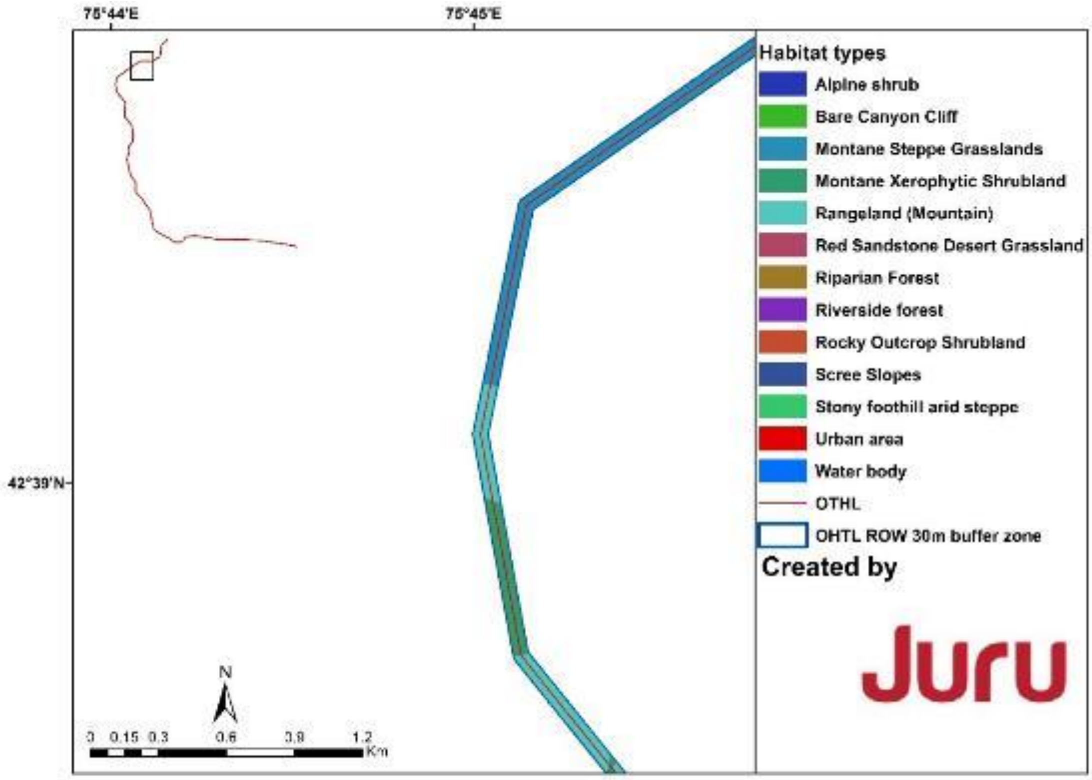


Figure 86: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (13-17 km of OHTL line)

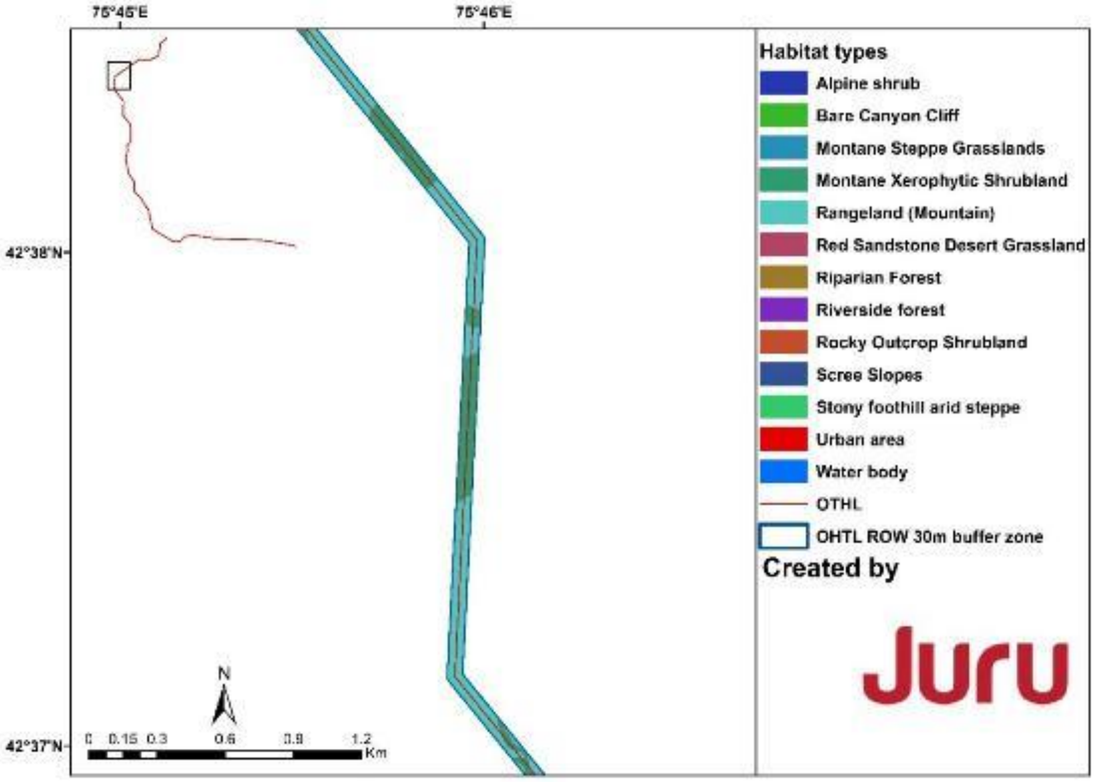


Figure 87: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (17-20 km of OHTL line)

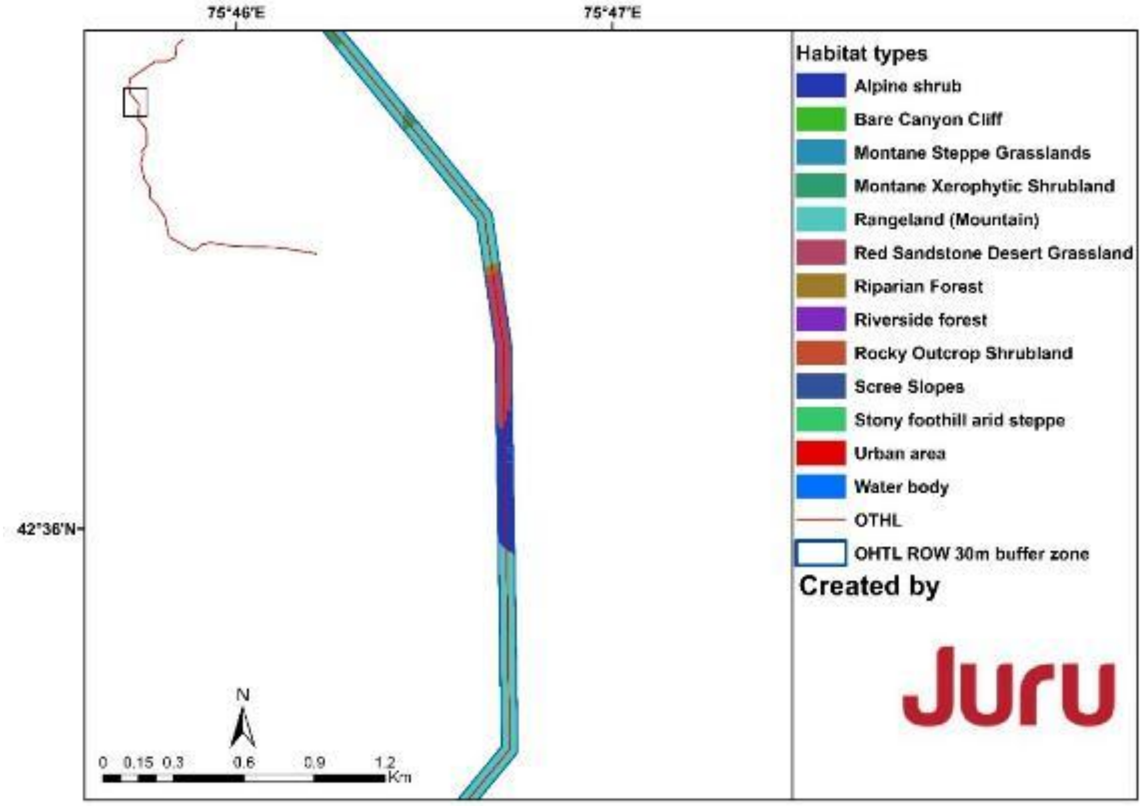


Figure 88: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (20-23 km of OHTL line)

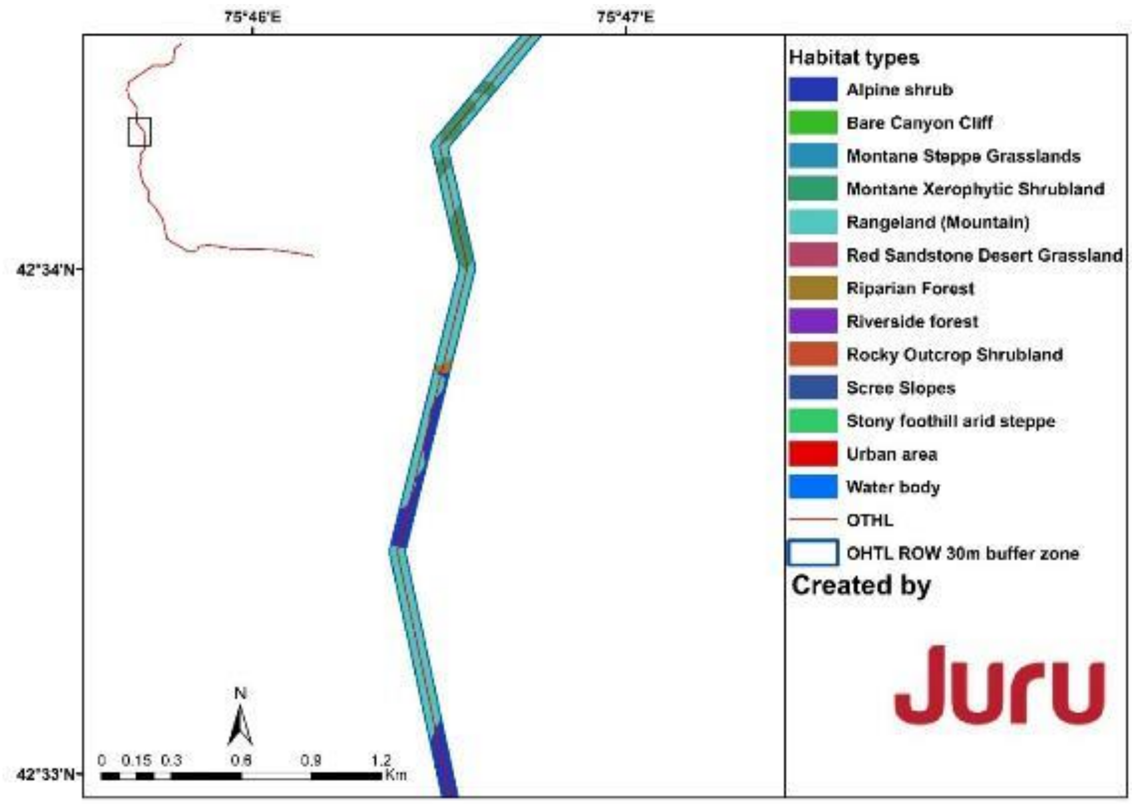


Figure 89: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (23-26 km of OHTL line)

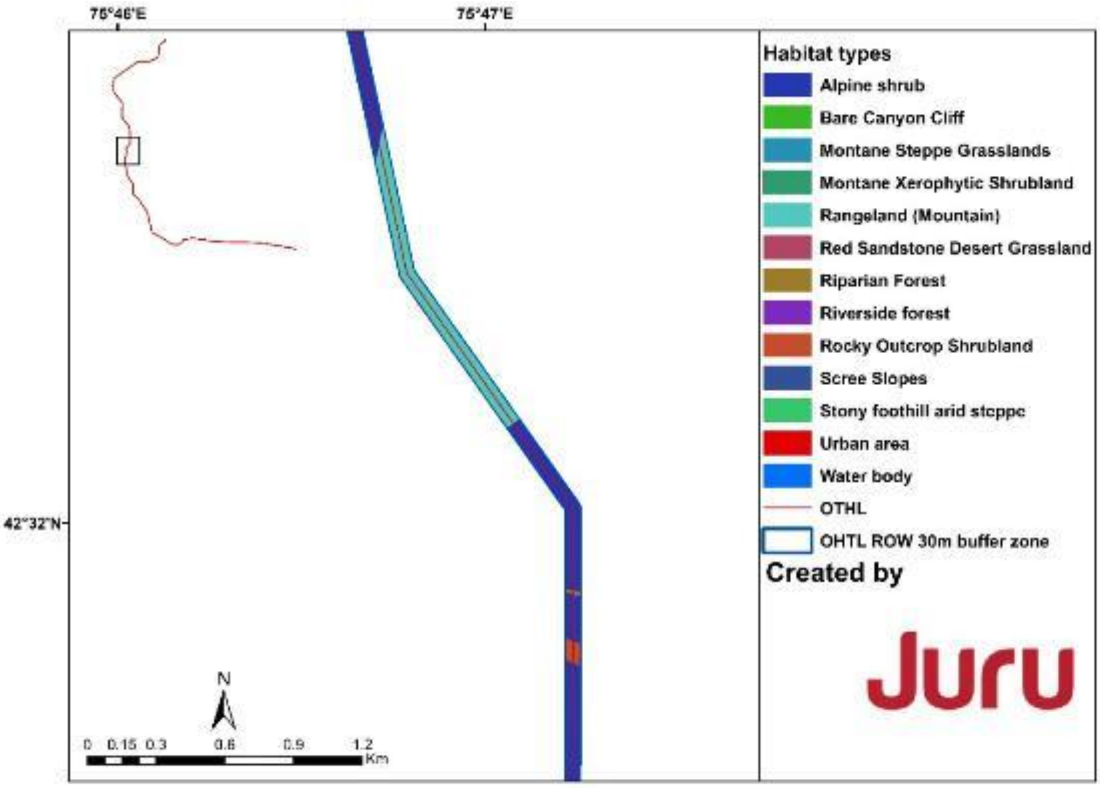


Figure 90: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (26-29 km of OHTL line)

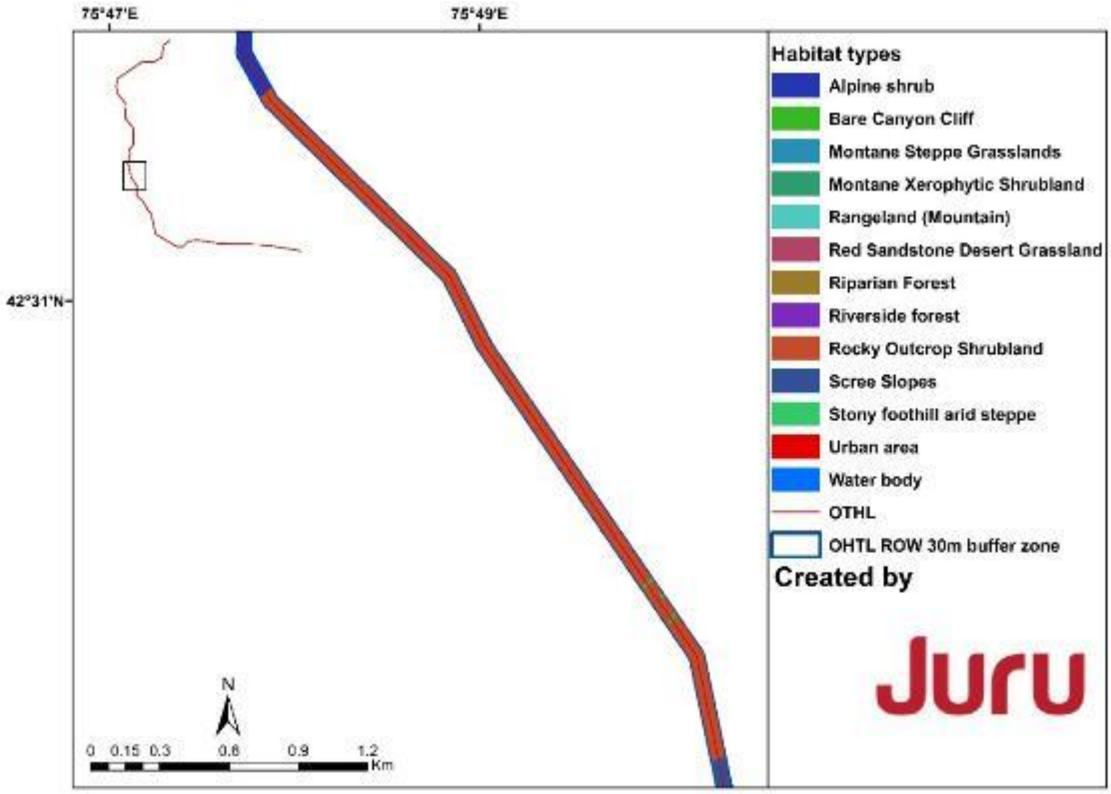


Figure 91: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (29-32 km of OHTL line)

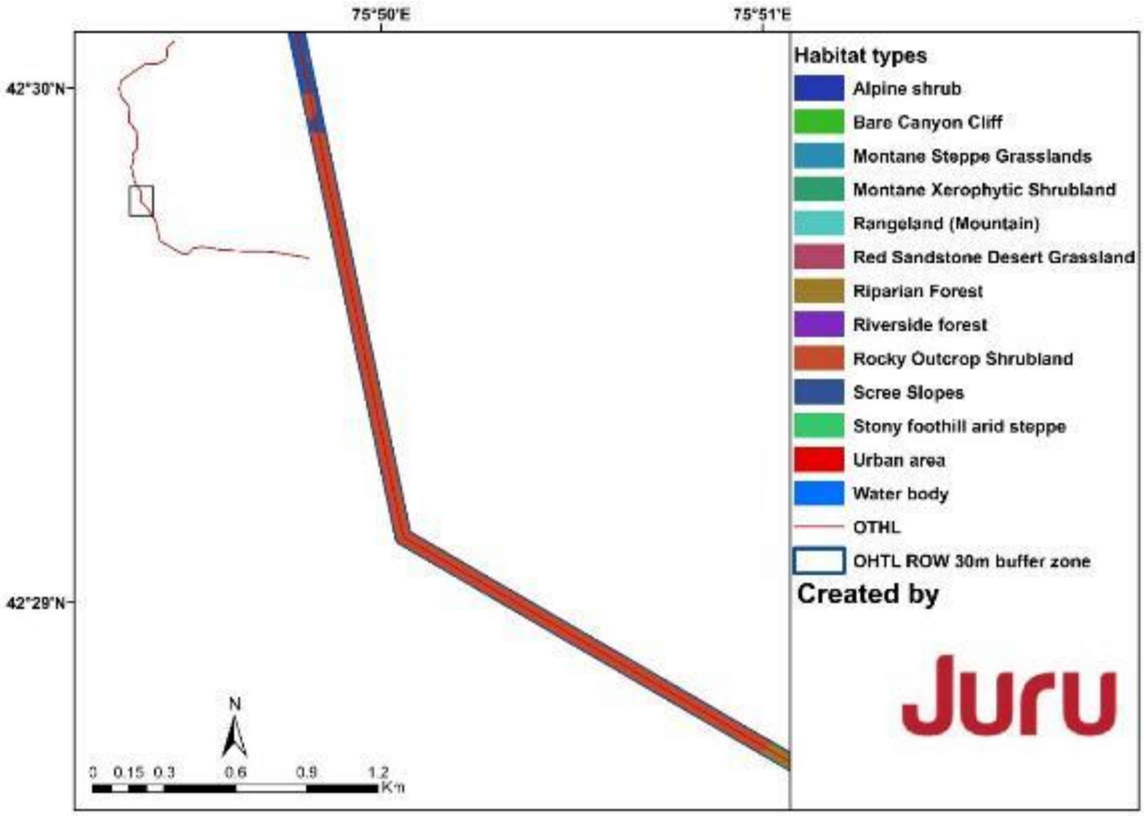


Figure 92: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (32-35 km of OHTL line)

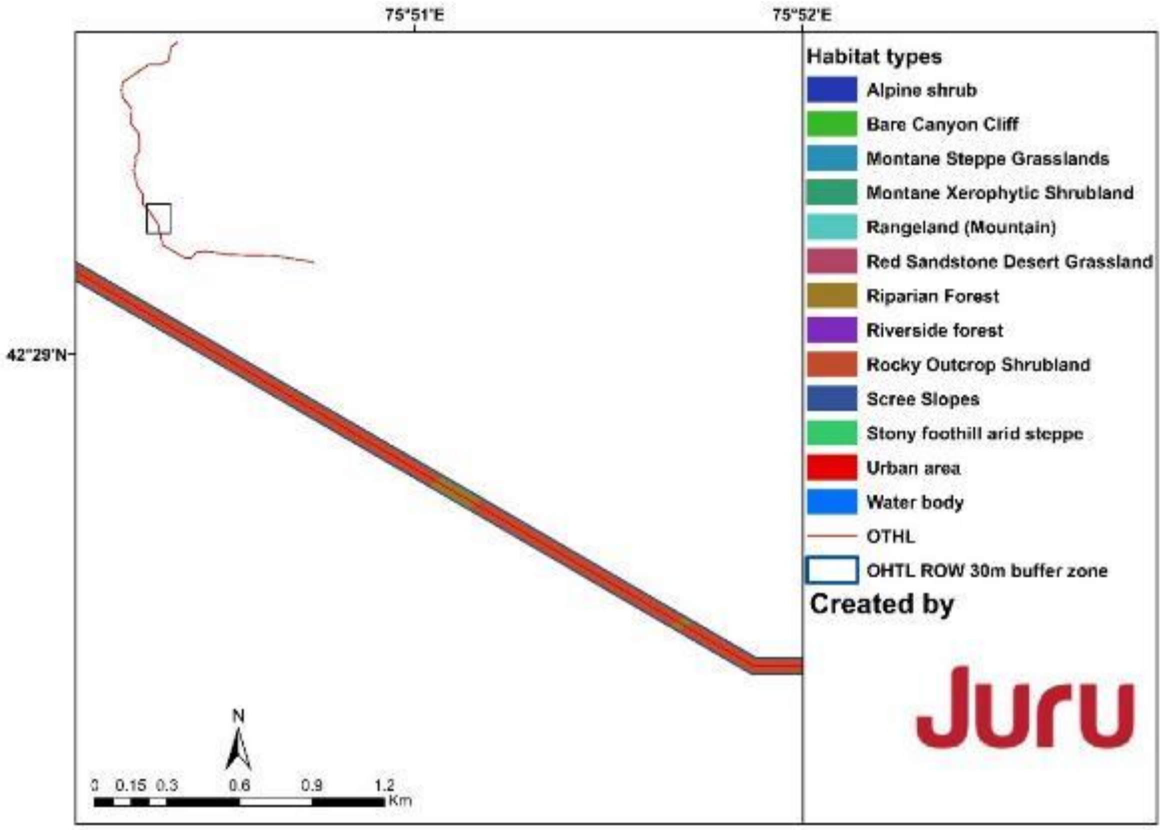


Figure 93: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (35-39 km of OHTL line)

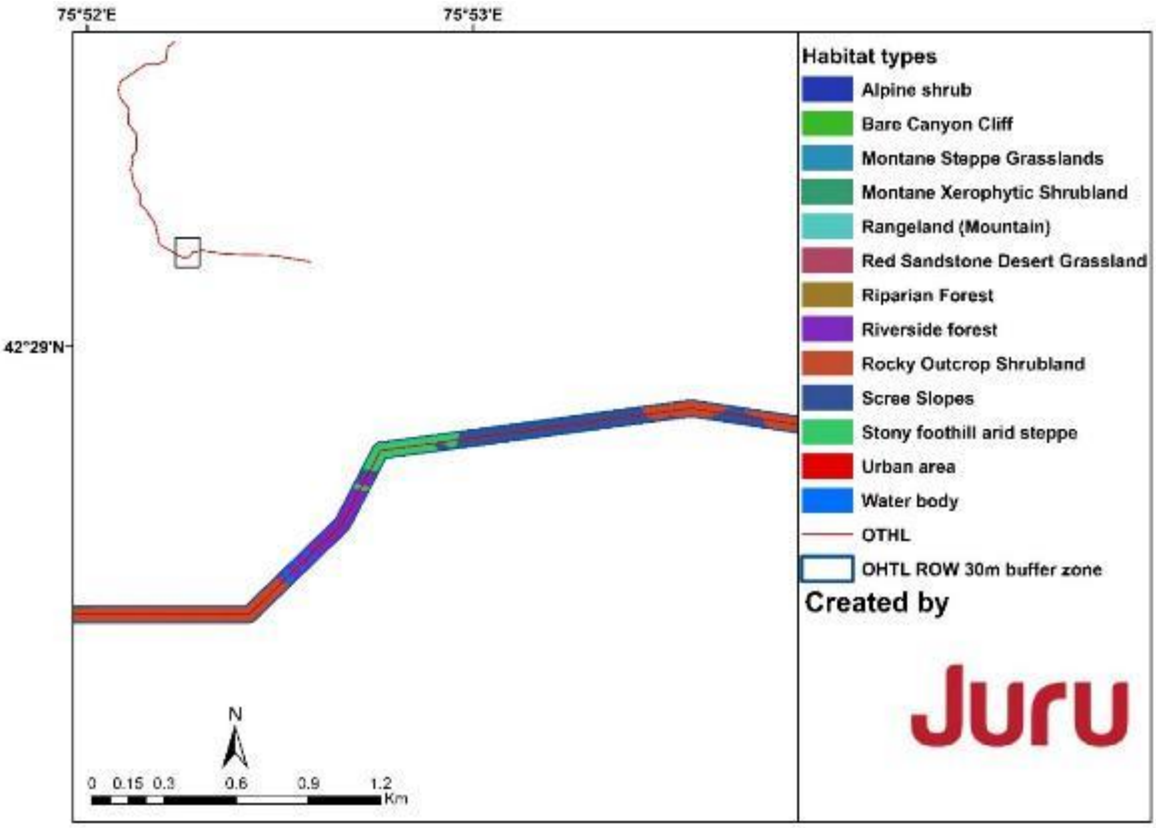


Figure 94: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (39-42 km of OHTL line)

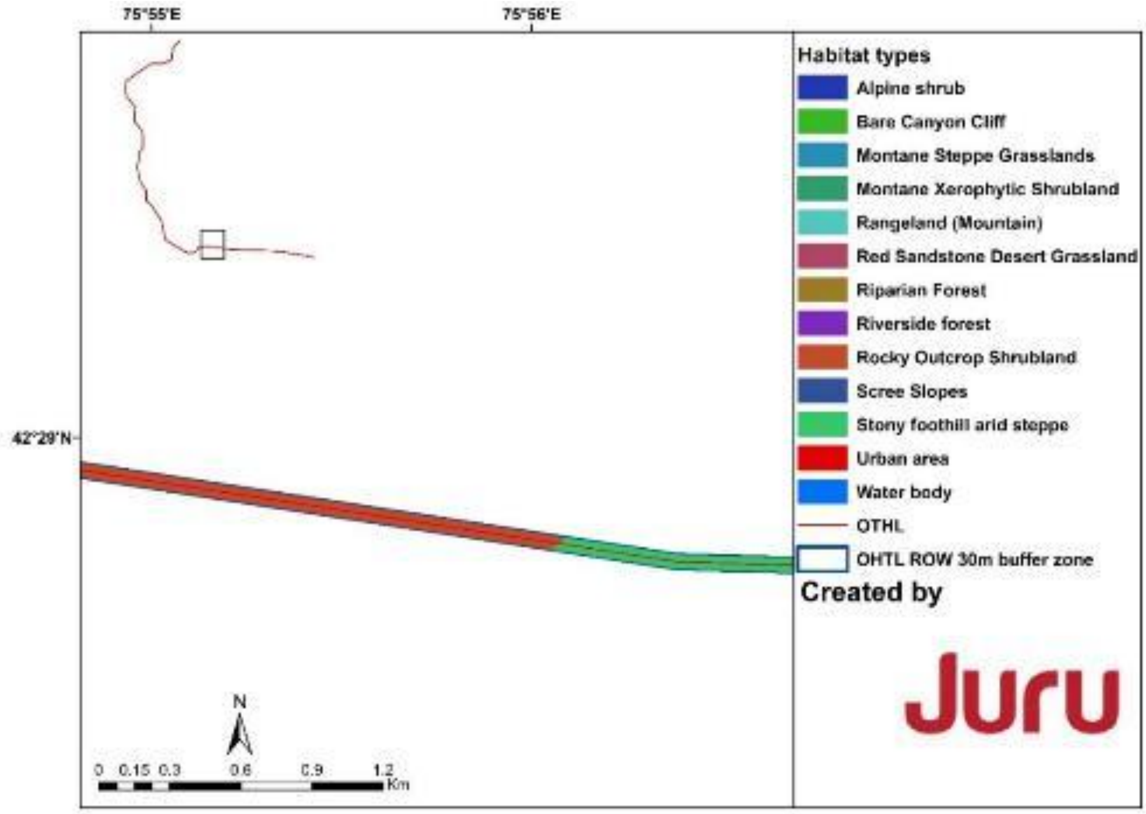


Figure 95: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (42-45 km of OHTL line)

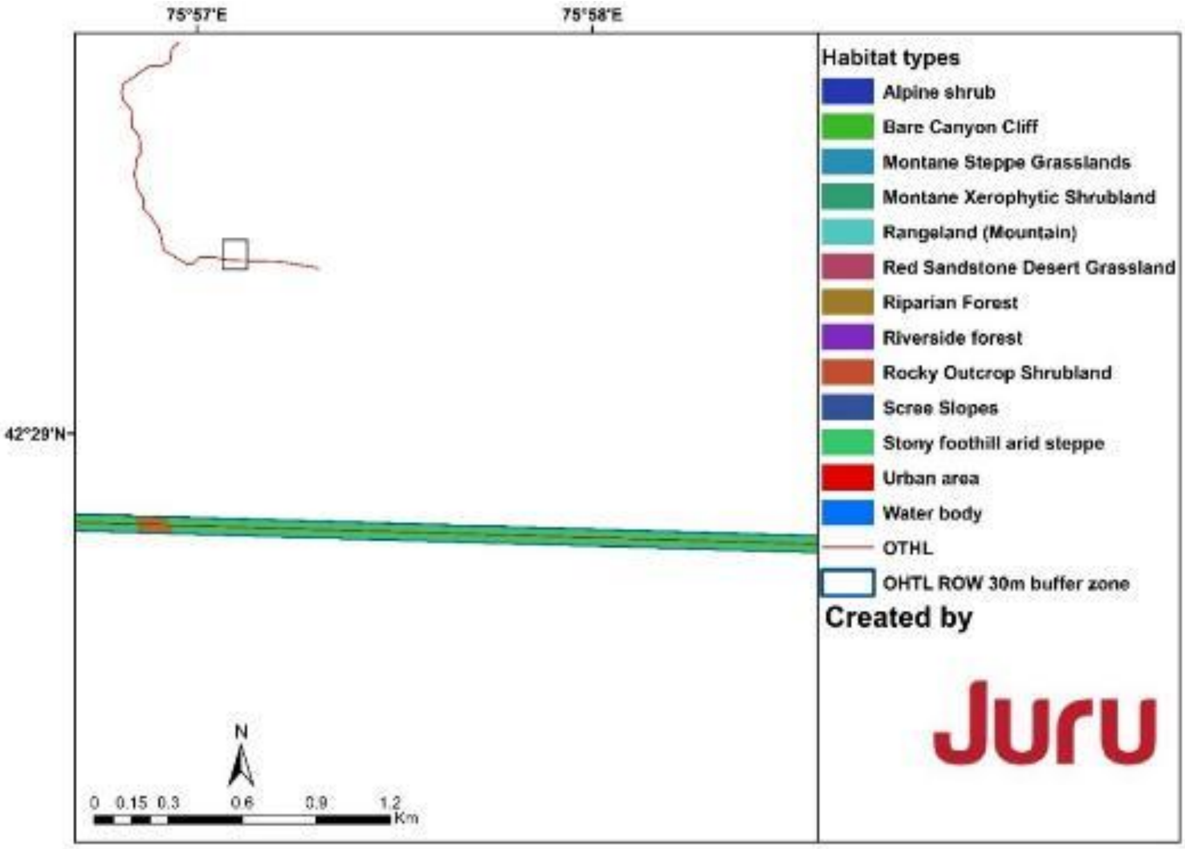


Figure 96: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (45-47 km of OHTL line)

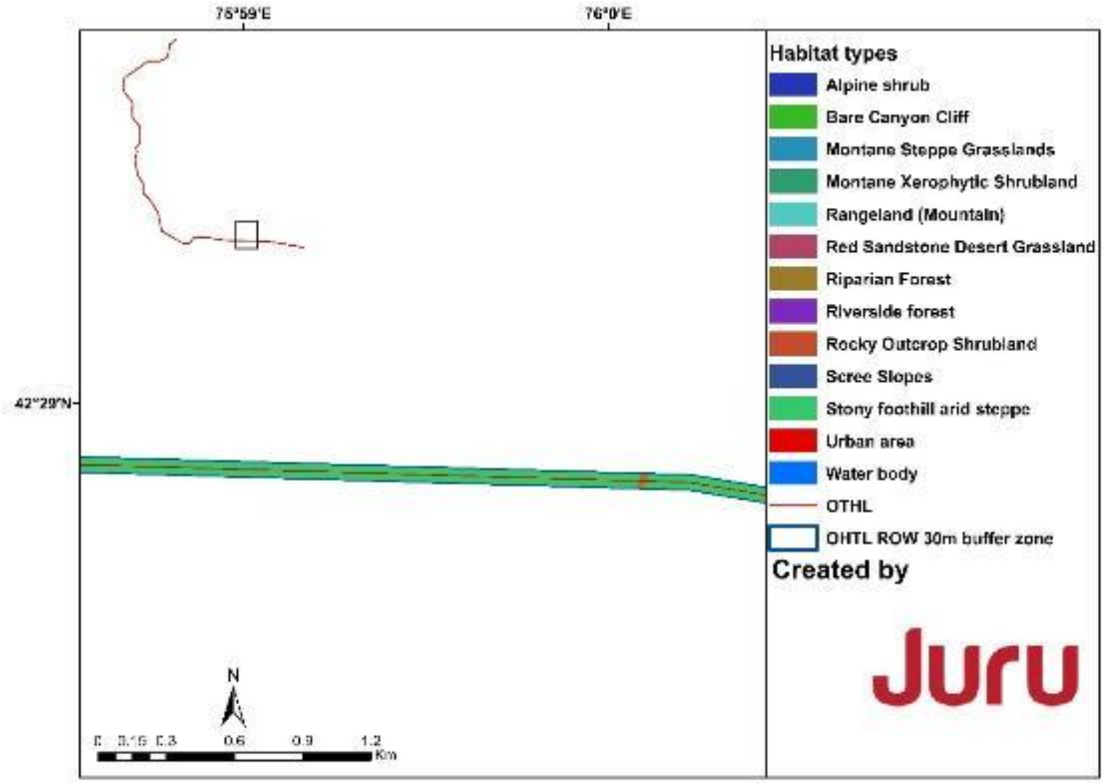


Figure 97: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (47-50 km of OHTL line)

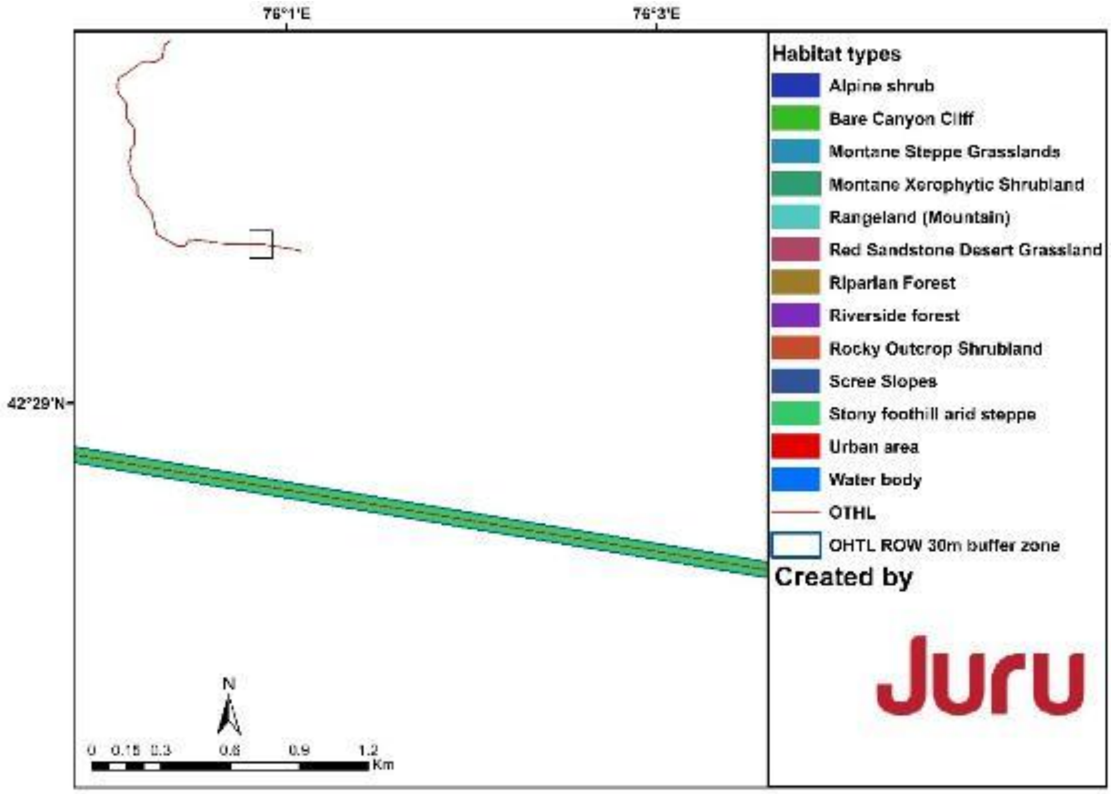
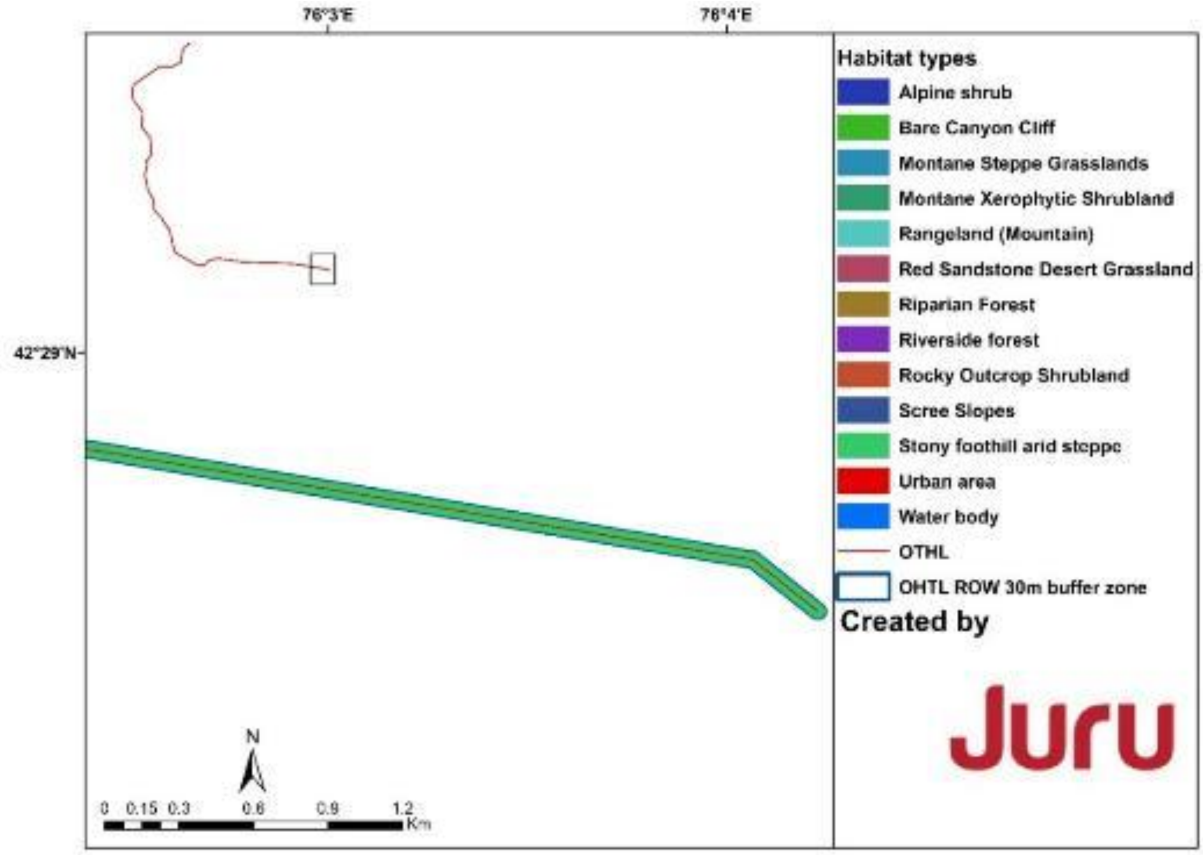


Figure 98: Habitat Types within the 30 m Buffer Zone along the OHTL Corridor (50-52 km of OHTL line)



Alpine shrub (13.2 Shrubland - Subalpine/Alpine)

The Alpine shrub habitat is predominantly distributed in the northern sections of the OHTL corridor within the buffer zone. These habitats are typically found in mid to high-elevation zones and are characterized by dense shrub cover that thrives under cool, moist conditions. The proximity to mountain slopes and ridges creates a favorable environment for species such as dwarf shrubs and other hardy vegetation adapted to alpine climates. The distribution of alpine shrubs along the OHTL highlights the interaction between the natural landscape and infrastructure development, emphasizing the need for careful management to minimize ecological impacts.

Figure 99: View of Alpine shrub.

Bare Canyon Cliff (7.2.1 Scree, boulders and outcrops)

The Bare Canyon Cliff habitat is primarily located in the southern sections of the OHTL corridor within the designated 500 m buffer zone. This habitat is characterized by steep, eroded sandstone formations with minimal soil development and very sparse vegetation cover, typically limited to drought-resistant shrubs and ephemerals clinging to rock crevices. The rugged terrain and striking red and white canyon walls create a distinctive visual landscape, offering important microhabitats for cliff-adapted species such as reptiles and birds of prey. In addition to its ecological uniqueness, this habitat exhibits high geotourism potential due to its scenic geological formations, attracting increasing numbers of visitors and outdoor enthusiasts. Its growing popularity as a destination for eco-tourism and photography further underscores the importance of managing this area to balance conservation priorities with sustainable recreational use.

Figure 100: View of Bare Canyon Cliff.

Riverside forest

Riverside forests are primarily distributed along streams and rivers within the study area. These habitats typically feature species from the genera willow (*Salix*), poplar (*Populus*), birch (*Betula*), and tamarix (*Tamarix*). In some areas, they are also interspersed with sea buckthorn (*Hippophae rhamnoides* L.), which thrives in riparian conditions.

Figure 101: View of Riverside forest along the planned OHTL

Montane Steppe Grasslands (4.4 Temperate Grassland - Alpine)

The Rangeland (Mountain) habitat type is widely distributed along mid- to upper-elevation zones within the 500 m buffer of the OHTL corridor. This habitat is defined by gently sloping to moderately steep terrain covered with a mosaic of grasses, forbs, and scattered xerophytic shrubs. Dominated by herbaceous vegetation, it serves as a key seasonal grazing area for livestock, especially sheep and cattle, and is integral to local pastoral livelihoods. The relatively open structure of this habitat allows for moderate ecological resilience, although signs of overgrazing can be observed in some sections. In addition to its pastoral value, the Rangeland (Mountain) landscape also presents scenic vistas of surrounding valleys and ridges, attracting occasional nature tourists and hikers. Its dual function as both a cultural grazing landscape and a natural habitat highlights the importance of sustainable rangeland management to support biodiversity and local economies.

Figure 102: View of Montane Steppe Grasslands along the OHTL route

Montane Xerophytic Shrubland (3.8 Desert Shrubland – Temperate)

The Montane Xerophytic Shrubland habitat, as observed along the OHTL corridor within the 500 m buffer zone, is typically found on dry, south-facing slopes and moderately steep hillsides. This habitat is characterized by sparse to moderately dense stands of drought-tolerant woody shrubs interspersed with grasses and herbaceous species. The vegetation is well-adapted to arid montane conditions with shallow soils and high solar exposure. Dominant shrub species often include *Artemisia*, *Atraphaxis*, and other xerophytes capable of surviving prolonged dry periods. These habitats serve as important ecological transition zones between steppe and alpine environments and support a specialized assemblage of flora and fauna. The presence of access roads and powerline towers increases the visibility of these landscapes, occasionally drawing tourists and photographers interested in semi-arid mountain ecosystems. However, the fragile structure of xerophytic shrublands makes them sensitive to disturbance, necessitating careful monitoring and management in the face of infrastructure development.

Figure 103: View of Montane Xerophytic Shrubland along the planned OHTL

Rangeland (Mountain) (4.5 Temperate Grassland - Montane)

The Rangeland (Mountain) habitat within the 500 m buffer zone of the OHTL corridor is primarily located in mid- to upper-elevation zones and is dominated by a mosaic of herbaceous vegetation and scattered shrubs. These rangelands are extensively used for grazing by livestock, particularly sheep and cattle, and support a variety of drought-adapted grasses such as *Festuca* and *Stipa*, along with subshrubs like *Artemisia* and *Acantholimon*. The terrain is typically rolling to moderately steep, with soils that are often shallow and prone to erosion under intensive grazing. While these areas are of moderate to high pastoral value, they are ecologically vulnerable to overgrazing and trampling. The visual openness of the rangeland and its integration with scenic mountainous backdrops also contributes to its attractiveness for recreational hiking and ecotourism. The proximity of this habitat to the transmission line infrastructure underscores the importance of sustainable grazing practices and landscape-level planning to balance biodiversity conservation with traditional land use.

Figure 104: View of Rangeland (Mountain) habitat along the OHTL

Riparian Forest (1.4.2 Riparian Forest - Temperate)

The Riparian Forest habitat along the OHTL corridor buffer zone occurs in narrow, linear formations adjacent to streams and seasonal watercourses. These areas are characterized by relatively dense woody vegetation and moisture-dependent flora, including species such as *Salix* (willows), *Populus* (poplars), and understorey plants like *Rosa* and *Berberis*. This habitat plays a crucial ecological role by stabilizing stream banks, filtering runoff, and providing habitat connectivity for terrestrial and aquatic species. Unlike other land classes, Riparian Forests serve as vital ecological corridors, facilitating species migration and genetic exchange. The microclimatic conditions created by canopy shade and consistent soil moisture distinguish this zone from the surrounding arid and semi-arid uplands. Human impact is generally low due to the terrain and seasonal water flow, though occasional browsing by livestock and erosion from upstream disturbances can affect vegetation structure. Importantly, these riparian belts act as biodiversity refugia in dry landscapes and should be prioritized for protection and integrated into hydrological and habitat restoration efforts.

Figure 105: View of Riparian Forest along the planned OHTL

Stony foothill arid steppe (4.6 Temperate Grassland - Semi-arid)

The Stony Foothill Arid Steppe habitat is predominantly distributed in the southern portion of the buffer zone. This habitat is characterized by arid conditions, stony soils, and sparse vegetation, primarily composed of drought-tolerant grasses, shrubs, and herbs adapted to semi-arid environments.

Figure 106: View of Stony Foothill Arid Steppe along the OHTL corridor

Scree Slopes (7.2.1 Scree, boulders and outcrops)

The Scree Slopes habitat type within the OHTL ROW buffer zone is characterized by loose, fragmented rock debris that accumulates on steep inclines, often at the base of cliffs or escarpments. These zones are defined more by geomorphology than vegetation, with unstable substrates limiting plant establishment. However, a unique assemblage of pioneer and crevice-dwelling species—such as *Ephedra*, *Cousinia*, or cushion-forming *Acantholimon*—may be present, adapted to withstand mechanical stress, poor soil retention, and drought. Unlike other habitats, Scree Slopes provide microhabitats for cold-adapted and disturbance-tolerant species and can serve as refuges from grazing due to their inaccessibility. They also contribute to slope stabilization and act as sediment sources for adjacent ecosystems. From a conservation perspective, these habitats are significant for supporting rare or endemic flora and fauna adapted to harsh, rocky environments. The visual contrast and geomorphological features of scree terrain also enhance its scientific and geotourism value, warranting careful consideration during infrastructure development or slope modification activities.

Figure 107: View of Stony Foothill Arid Steppe along the OHTL route

Rocky Outcrop Shrubland (7.2.1 Scree, boulders and outcrops)

The Rocky Outcrop Shrubland habitat is one of the most structurally distinctive and ecologically significant types within the OHTL ROW buffer zone. It is characterized by rugged terrain with exposed rock surfaces interspersed with drought-adapted shrubs such as *Artemisia*, *Spiraea*, and *Berberis*. These outcrops often occur along ridgelines, escarpments, and elevated slopes where soil development is minimal, and vegetation establishes in crevices or shallow pockets. The habitat supports a specialized flora that tolerates intense sun exposure, limited moisture, and nutrient-poor substrates, and may also harbor localized endemic or relict species. Due to its inaccessibility for agriculture and low palatability for livestock, this habitat typically remains relatively undisturbed, serving as a refuge for native biodiversity. Additionally, the mosaic of rocks and vegetation provides microhabitats for reptiles, invertebrates, and ground-nesting birds. From an ecological and visual perspective, Rocky Outcrop Shrublands contribute significantly to landscape heterogeneity and resilience, reinforcing their importance for conservation planning and habitat integrity along the OHTL ROW.

Figure 108: View of Rocky Outcrop Shrubland along the OHTL route

Red Sandstone Desert Grassland (3.7 Desert Grassland – Temperate)

This habitat occurs primarily on gently sloping terraces and plateau-like surfaces formed by eroded red sandstone substrates within the lower zones of the OHTL ROW buffer. It is dominated by sparse but structured communities of drought-resistant grasses such as *Stipa*, *Achnatherum*, and *Poa bulbosa*, interspersed with low forbs and occasional ephemeral species that respond to short moisture pulses. The striking red geological backdrop and limited soil depth create a visually unique and ecologically stressed environment, where plant cover rarely exceeds 25%. Unlike true steppe or shrubland, this habitat lacks significant woody plant structure and is shaped primarily by edaphic constraints and aridity. Its open terrain and geological aesthetic offer high geotourism appeal, though the grassland's low resilience to trampling and off-road access calls for strict management to prevent degradation.

Figure 109: View of Red Sandstone Desert Grassland along the OHTL route

Red Sandstone Desert Shrubland (3.8 Desert Shrubland – Temperate)

Occupying eroded slopes, canyon rims, and dissected sandstone hillsides, the Red Sandstone Desert Shrubland is defined by the dominance of hardy xerophytic shrubs such as *Anabasis salsa*, *Haloxylon persicum*, and *Reaumuria soongarica*. These species are adapted to extreme temperature fluctuations, low precipitation, and high substrate salinity or alkalinity often associated with sandstone-derived soils. The vegetation is discontinuous, forming isolated patches on rocky outcrops or in sediment-accumulating hollows. This habitat plays a critical role in stabilizing fragile sandstone formations and sustaining faunal species adapted to open, arid shrubland conditions. Its spatial distribution is often limited to specific geomorphological niches, making it an ecologically important yet vulnerable component of the desert landscape. Additionally, its scenic value contributes to visitor interest, especially among nature photographers and eco-tourists exploring arid mountain environments.

Figure 110: View of Red Sandstone Desert Shrubland.

4.6.3.2 Botanical surveys

Two botanical surveys conducted on 14–18 September 2024 and 12–14 May 2025 identified a total of over 300 vascular plant species. This botanical survey encompassed a total of 72 geobotanical survey points spanning an altitudinal gradient in the eastern extension of the OTHL ROW and 500 m buffer zone. The area surveyed included habitats from riparian woodlands and high-elevation grasslands to arid semi-desert shrublands. The dataset captured substantial floristic and structural variation across these ecosystems. The field surveys were conducted in two distinct phenological phases, spring and autumn, which allowed for the documentation of both ephemeral and perennial vegetation components. This two-seasonal strategy was particularly effective in recording geophytes such as *Tulipa spp.*, whose phenology is confined to the early growing season. Geophytes were generally absent from autumn observations, underscoring the value of spring-season monitoring for bulbous plants.

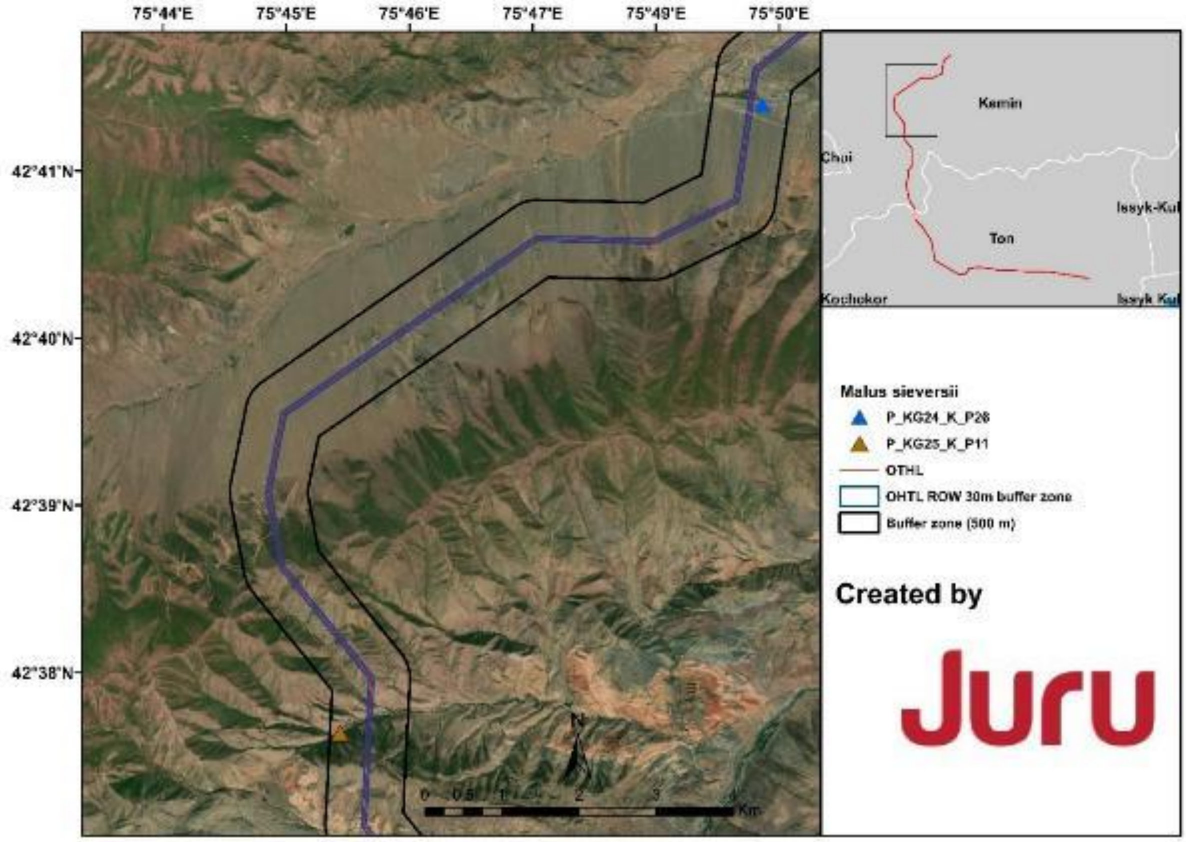
4.6.4 Sensitive plant species

Six species of plants were identified as PBF for the Project. Three of them were documented during the Project’s baseline studies. None of them trigger a Critical Habitat determination.

Malus sieversii (IUCN VU, Kyrgyz LC)

This small tree species is considered to be the living wild relative of domesticated apples, thus carrying a level of conservation and genetic significance. Only two individuals were encountered during the baseline survey within the Project’s EAAA (P_KG25_K_P11, P_KG24_K_P26) (Figure 111). Thus, this species does not trigger CH under criterion 2b, as the Project has no likelihood of causing this species to be globally uplisted to CR/EN status.

Figure 111: Location of Malus sieversii along the OTHL buffer zones



Amygdalus bucharica (IUCN VU, Kyrgyz unlisted)

This small tree species could potentially occur within the Project region, but was not encountered during the baseline survey, hence it does not trigger CH under criterion 2b, as the Project has no likelihood of causing this species to be globally uplisted to CR/EN status.

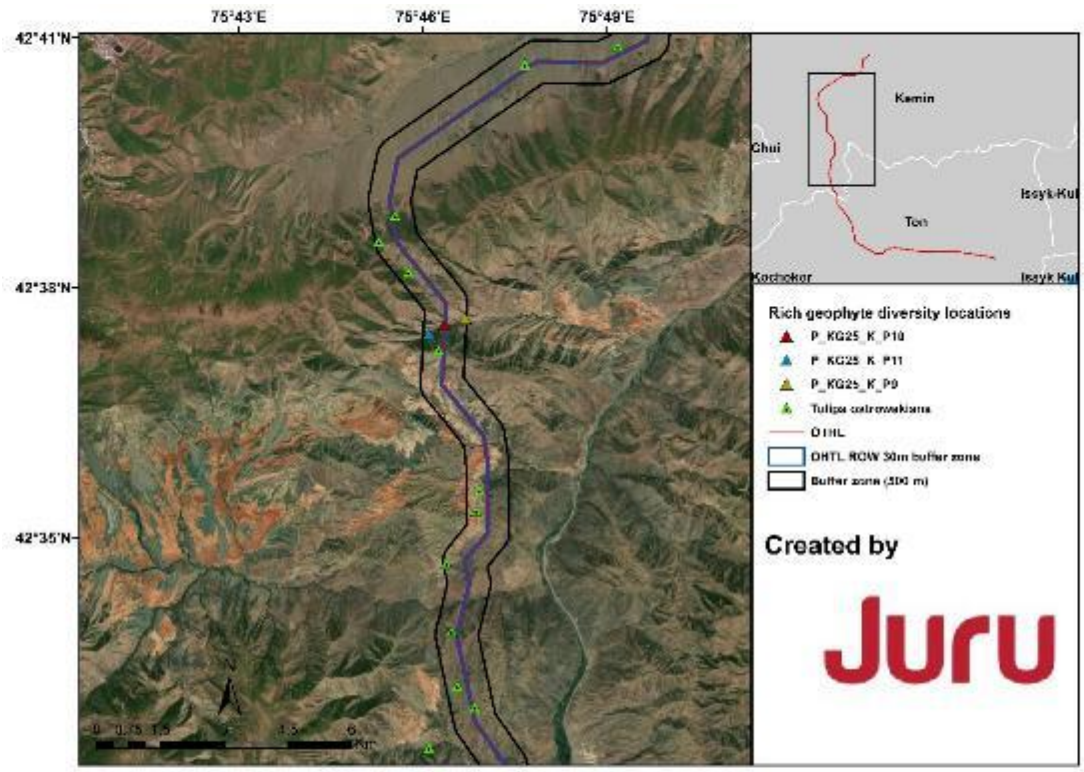
Tulipa greigii (IUCN LC, Kyrgyz EN)

This perennial geophyte species could potentially occur within the Project region, but was not encountered during the baseline survey, hence it does not trigger CH under criterion 2c, as the Project's EAAA does not contain a nationally important concentration of this species.

Tulipa ostrowskiana (IUCN NT, Kyrgyz VU)

This perennial geophyte species was encountered in 14 of the 72 botanical sample plots during the baseline study, including 12 located within the Project's EAAA. This species was encountered primarily in subalpine meadows, rocky montane slopes, and mesic steppe communities, where it sometimes comprised up to 10% cover of botanical survey plots. This suggests that the study area represents a core zone of its ecological distribution, with viable populations capable of flowering and regeneration. Plots such as P_KG25_K_P10, P_KG25_K_P11, and P_KG25_K_P9 exhibited particularly rich geophyte diversity, with T. ostrowskiana co-occurring alongside Gagea lutea, Tulipa tarda, and Allium oreoprasum (Figure 112). There is no possible CH trigger, due to its low-moderate conservation status on national and international red lists, but it is protected under the national regulatory framework of Kyrgyzstan, hence it is considered to trigger PBF criterion iii, and classified as a PBF for the Project.

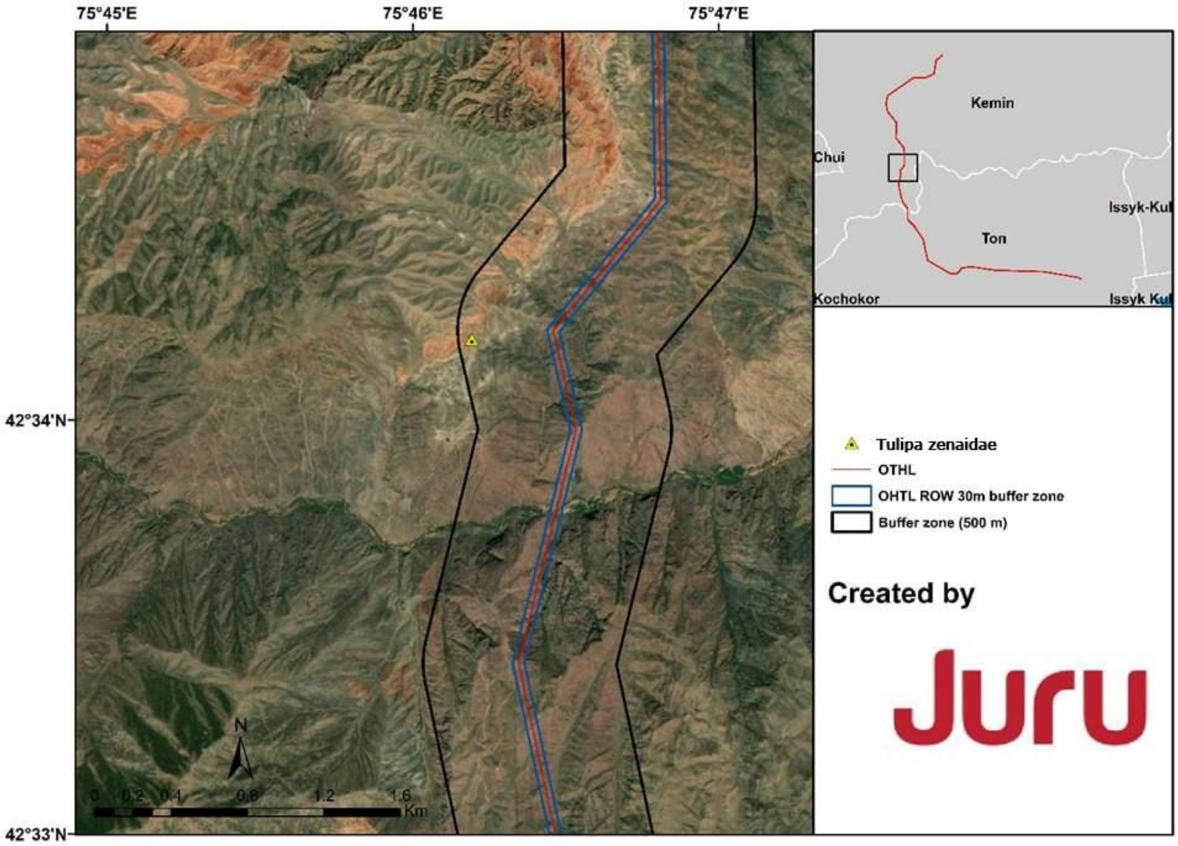
Figure 112: Locations of Tulipa ostrowskiana along the OTHL buffer zones



Tulipa zenaidae (IUCN VU, Kyrgyz VU)

This perennial geophyte species was encountered in one of the 72 botanical survey plots during the baseline study. With such a limited presence within the Project's EAAA, it does not trigger CH under criterion 2b, as the Project has no likelihood of causing this species to be globally uplisted to CR/EN status.

Figure 113: Location of Tulipa zenaidae along the OTHL buffer route



Chesneya villosa (IUCN not evaluated, Kyrgyz EN)

This perennial geophyte species could potentially occur within the Project region, but was not encountered during the baseline survey; hence it does not trigger CH under criterion 2c, as the Project's EAAA does not contain a nationally important concentration of this species.

4.6.5 Avifauna

The bird species diversity of the areas adjacent to the proposed OHTL route varies in relation to habitat types and seasons. The clay and stony desert habitat adjacent to the western section of the route is characterized by such desert species as Pallas's and Black-bellied Sandgrouse, Chukar and several species of larks, while clay and stony cliffs here provide nesting sites for Black Stork, Wallcreeper, Long-legged Buzzard and, potentially, Saker (IUCN EN). The narrow mountain gorge along the central section of the OHTL provides breeding and feeding sites for many species of scavengers and birds of prey, including Himalayan, Cinereous and Bearded Vulture, Golden Eagle, and Common Kestrel. The riverine forests along the Chu River support many species of passerines, including several species of warblers, tits, redstarts, and thrushes.

Bird surveys were conducted for the project route in 2024 and 2025, including VP surveys, which concentrated on spring and autumn peak migratory periods. Raptor Nesting surveys were conducted in spring 2024 and 2025 and breeding bird surveys were conducted in spring 2024 in the easternmost part of the original OHTL route, where ESIA scoping had identified the potential for breeding activity of several waterbird species that might use littoral habitats surrounding Lake-Issyk-Kul.

4.6.5.1 Vantage Point Surveys

Three rounds of Vantage Point (VP) bird surveys were conducted, aiming to monitor sensitive bird species within the survey area and gather data on their abundance and use of airspace near the planned OHTL. The first two were conducted at 8 VPs along the original OHTL route in spring and autumn 2024, and the third round was conducted at 4 new VPs located along the new portion of the route in the northern section. In 2024, VP surveys were conducted between March 27 and May 10, and then again between September 4 and November 11, 2024, with 20 hours of VP survey conducted at each of the 8 points in each season (320 total hours, Figure 114, Table 44). In spring 2025, a further 82 hours of VP surveys were conducted at four additional locations (roughly 20 hours per VP) along the north-western section of the OHTL route between March 20 and April 14 (Figure 115, Table 45), with a total of 402 hours of VP surveys conducted throughout three seasons.

All VP surveys combined yielded observations of 124 bird species, including 8 of the species identified as PBF in the CHA.

Figure 114: Location of vantage points surveyed in spring and autumn 2024 along the proposed 500 kV OHTL Kemin-Balykchy

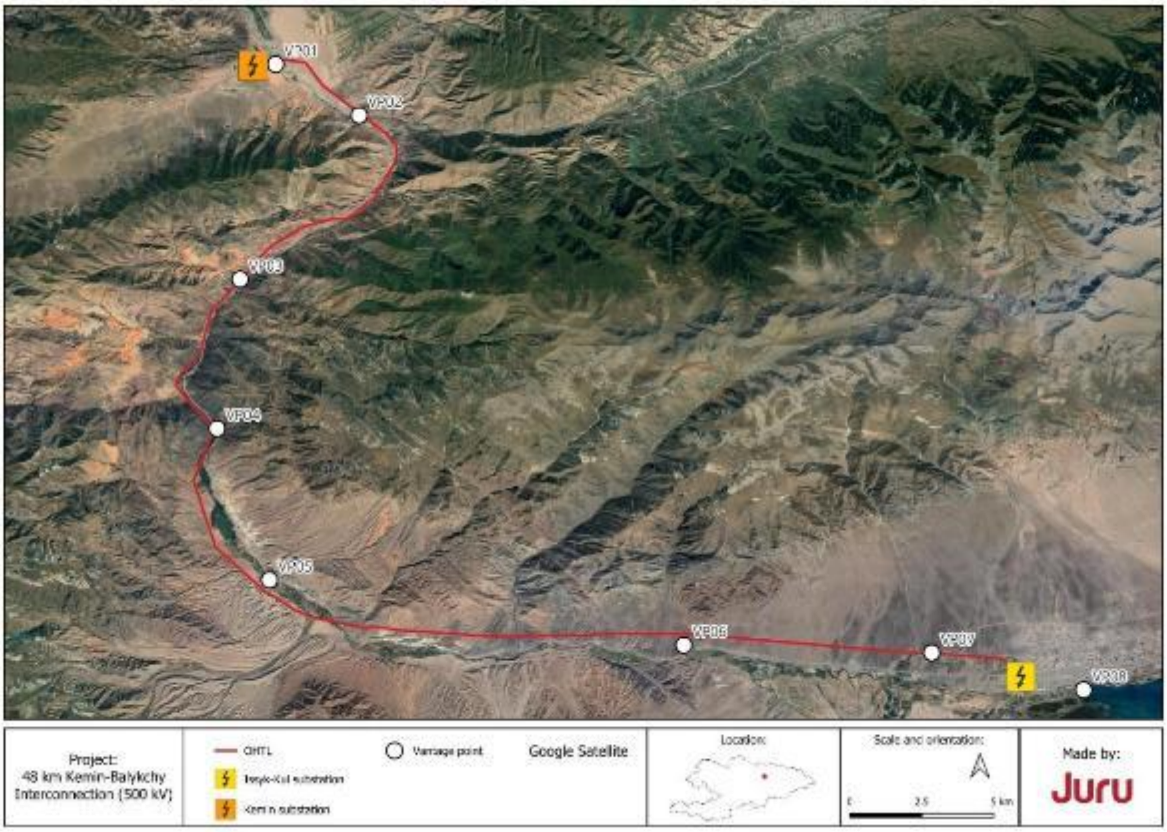


Table 44: Coordinates and description of vantage points surveyed in spring and autumn 2024 along the proposed 500 kV OHTL Kemin-Balykchi.

Survey Points	**Coordinates (dd)**		**Site description**
	N	**E**	
VP01	42.713709°	75.843865°	Fallow land near the Chu River, less than 2 km away - agricultural fields
VP02	42.692218°	75.879070°	The beginning of the canyon with trees and shrubs along the banks of the Chu River
VP03	42.623138°	75.828866°	Scree slope with eastern exposure, devoid of vegetation
VP04	42.560278°	75.819167°	Mountain gorge and Chu River with signs of excavations
VP05	42.496796°	75.843678°	Left bank of the Chu River with sandy alluvial soils and shrub vegetation
VP06	42.469005°	76.015956°	Alluvial cone on the southern exposure of the ridge
VP07	42.465120°	76.126961°	The slope of the southern exposure of the ridge with fallow lands and young bushes
VP08	42.450126°	76.184493°	Gently sandy shore of Lake Issyk-Kul with grassy vegetation

Figure 115: Locations of vantage points surveyed in spring 2025 along the north-western section of the OHTL route

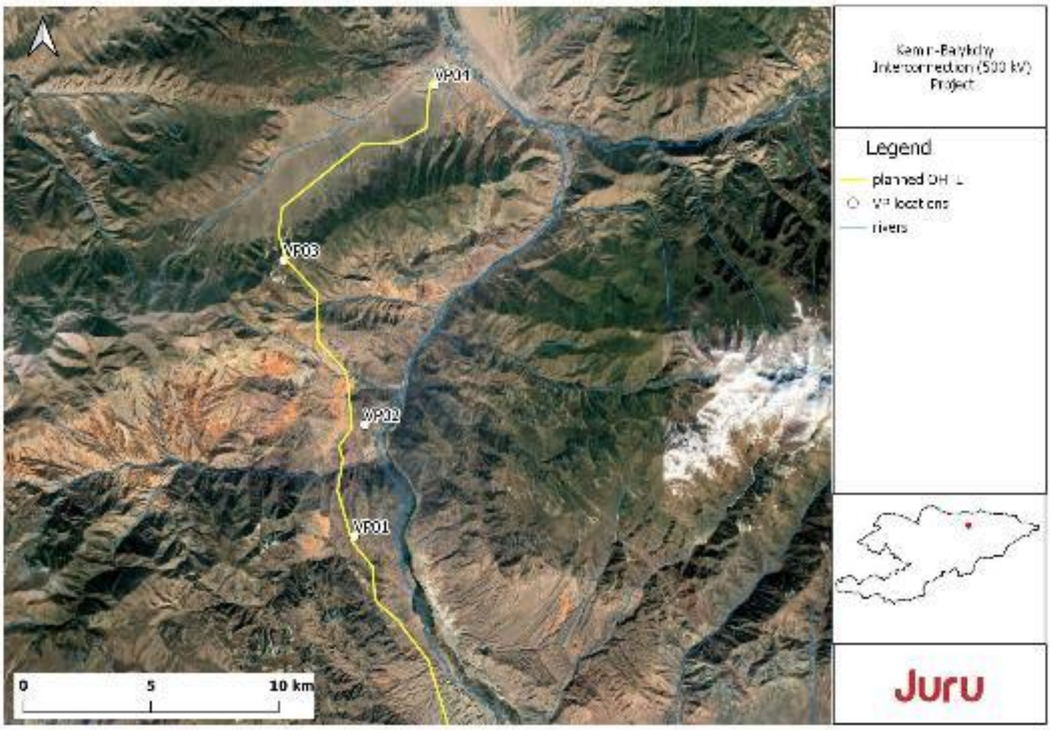


Table 45: Coordinates and description of vantage points surveyed in spring 2025 in the northwestern portion of the proposed 500 kV OHTL Kemin-Balykchi

Survey Points	Coordinates (dd)		Biotope
	N	E	
VP01	42.546186	75.789638	Ridgeline, semi-desert habitat
VP02	42.584935	75.794443	Ridgeline, overlooking Konorchok canyon to the west and Boom gorge to the east
VP03	42.643866	75.757027	Ridgeline, overlooking a wide valley to the west and rugged terrain to the east
VP04	42.705487	75.829838	Wide semi-desert valley, south of the Kemin sub-station

4.6.5.2 Raptor nest surveys

Initial surveys for raptor (and vulture) nests were conducted in spring and summer 2024 along the original OHTL route and additional surveys were conducted in April 2025 along the north-western section of the OHTL route.

Between May and late August 2024, 16 days of raptor/vulture survey were conducted within 5 km buffer along the proposed OHTL route, as shown in Figure 116. An additional 4 days of raptor nesting surveys for the Kemin-Balykchy OHTL were conducted between 3 and 6 April 2025 within a 1 km buffer, focusing on the northwestern section of the proposed OHTL route (Figure 117).

Figure 116: Survey tracks used during raptor/vulture nesting surveys along the proposed Kemin-Balykchy OHTL ROW in spring and summer 2024

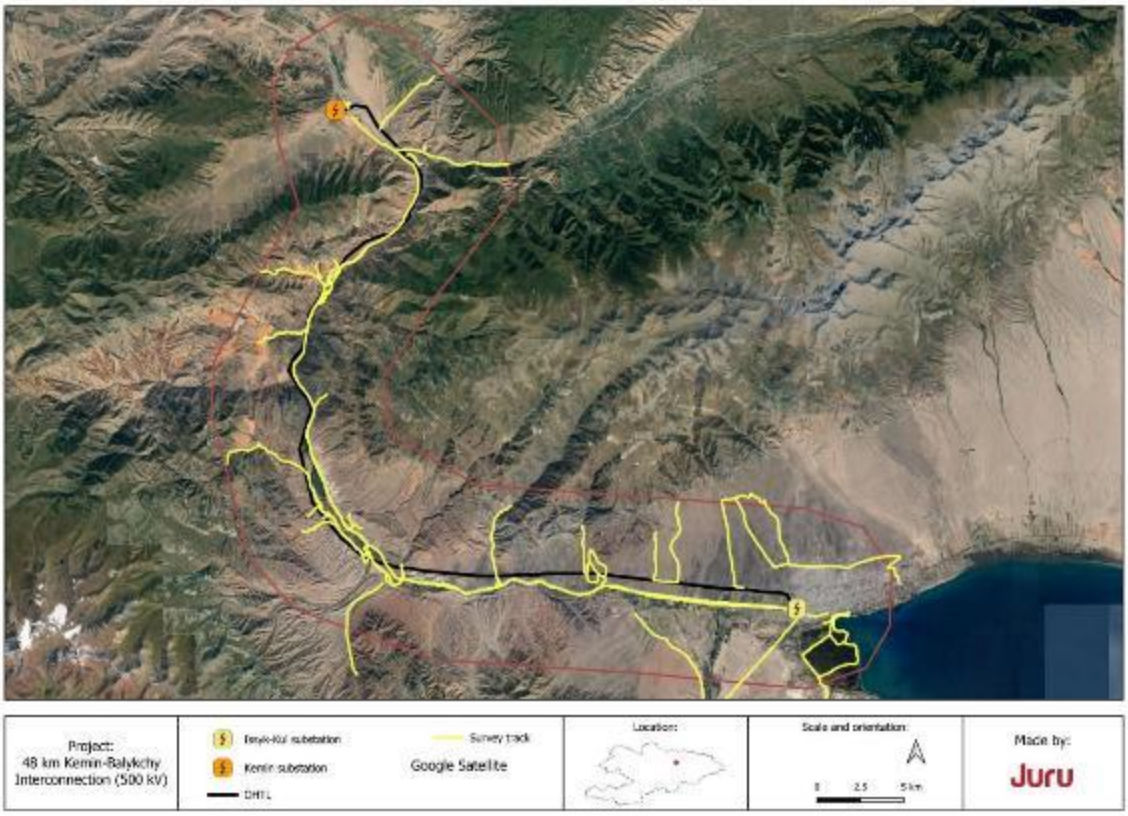
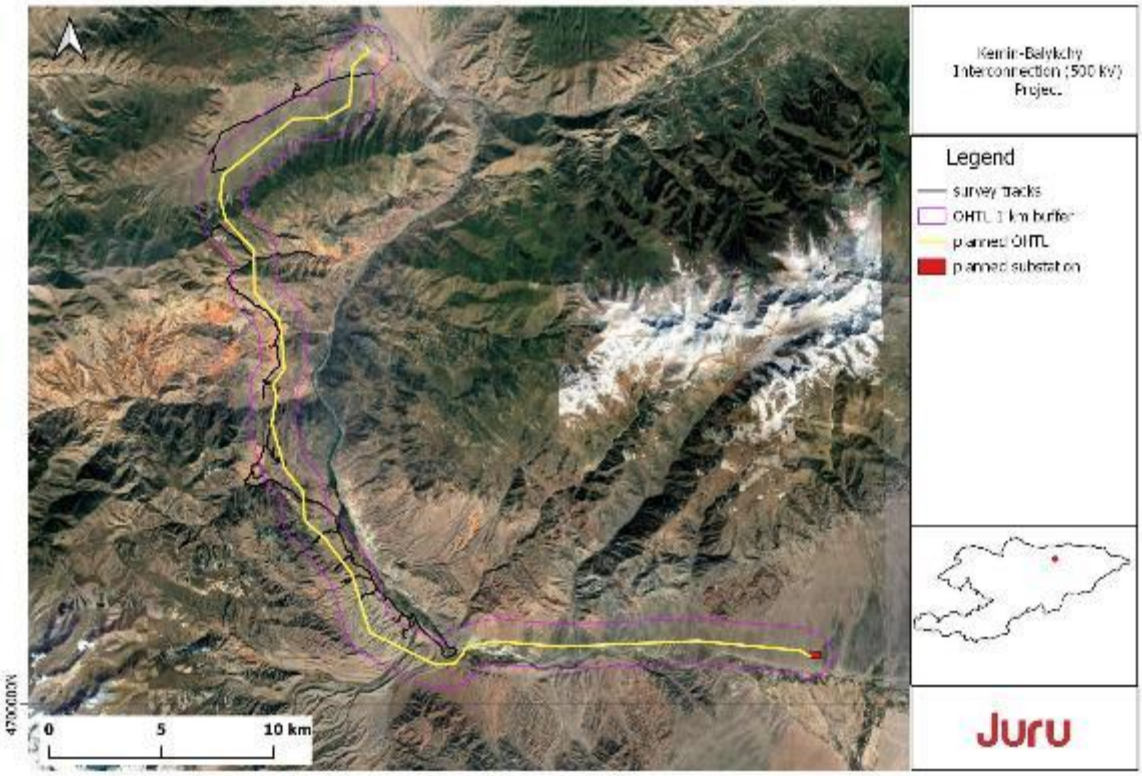
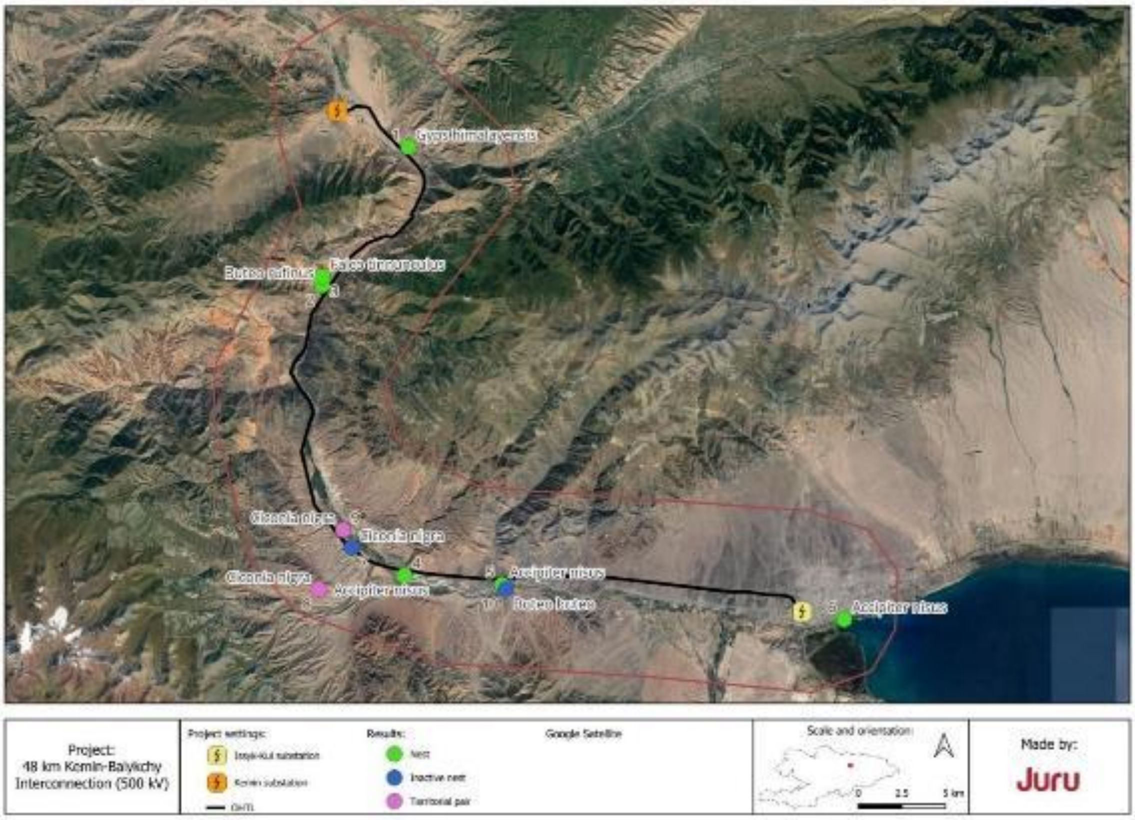


Figure 117: Survey routes used during raptor/vulture nesting surveys along the north-western section of the Kemin-Balykchy OHTL ROW in April 2025.



As a result of surveys in spring and summer 2024, six active nests of the following species were found: Himalayan Griffon (1), Long-legged Buzzard (1), Eurasian Kestrel (1), Eurasian Sparrowhawk (3). Additionally, two nests occupied in previous years by Black Stork and Common Buzzard (found in the area in previous years) were found inactive during the survey (Figure 118). All nests, except for one of the nests of Eurasian Sparrowhawk, were located within 660 meters of the route.

Figure 118: Nests (active and inactive) and key species observations during nest surveys in spring and summer 2024.



As a result of the spring 2025 raptor nesting surveys, six active nests of three species of raptors were found, including 3 Golden Eagle nests, 2 Long-legged Buzzard nests, and 1 Common Kestrel nest. The occupancy status of the active Long-legged Buzzard nest was directly confirmed by observations of adults on the nest. For four of the nests, occupancy/status was indirectly inferred based on observations of adult birds in proximity to the nests, fresh scat/streaking observed near the nests, and/or nest size, structure, and substrate. Additionally, one inactive raptor nest, one nest of an unidentified raptor species and an active roost site of Himalayan Griffon were found during surveys.

Locations of all nests and of the roost are shown in Figure 119 and additional details on these observations are provided in Table 46.

Five of the seven nests were located within a 1 km buffer zone around the planned OHTL and two at a distance over 2.5 km. The closest nest is located 205 m from the OHTL, while the roost of Himalayan Griffon was as close as 170 m.

Figure 119: Locations of raptor and vulture nests and roosts identified during surveys along the north-western section of Kemin-Balykchi OHTL between 3-6 April 2025. Nest numbers correspond to the numbers in Table 46

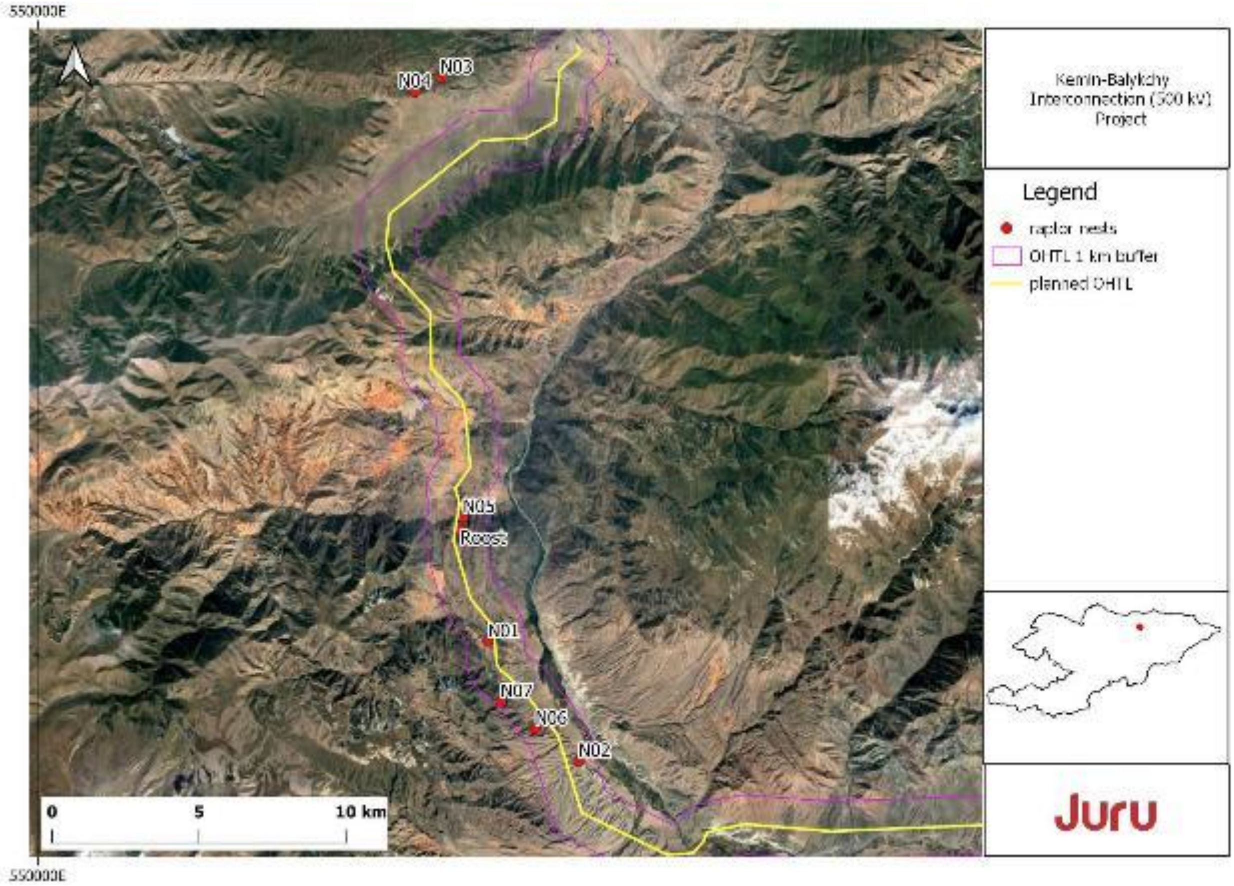


Table 46: Results of the raptor/vulture nest survey along the north-western section of the proposed Kemin-Balykchy OHTL route

N	Date	Species (scientific)	Species (EN)	Location	IUCN	Kyrgyz RDB	Distance to OHTL, m	Confirmation of nest identity and status
N01	03 April 2025	Golden Eagle	*Aquila chrysaetos*	42.530853 75.795511	LC	NT (VI)	234	Active, indirect
N02	05 April 2025	Common Kestrel	*Falco tinnunculus*	42.493993 75.832585	LC	-	323	Active, indirect
N03	06 April 2025	Long-Legged Buzzard	*Buteo rufinus?*	42.703765 75.777978	LC	-	2520	Active, indirect
N04	06 April 2025	Golden Eagle	*Aquila chrysaetos?*	42.699513 75.767271	LC	NT (VI)	2740	Inactive nest
N05	03 April 2025		unknown	42.569074 75.785744	-	-	205	Active, indirect
N06	05 April 2025	Long-legged Buzzard	*Buteo rufinus*	42.504063 75.814853	LC	-	483	Active, direct
N07	05 April 2025	Golden Eagle	*Aquila chrysaetos*	42.512448 75.800658	LC	NT (VI)	800	Indirect

N	Date	Species (scientific)	Species (EN)	Location	IUCN	Kyrgyz RDB	Distance to OHTL, m	Confirmation of nest identity and status
Roost	03 April 2025	Himalayan Griffon	*Gyps himalayensis*	42.565213 75.784466	NT	NT (VI)	170	Active, direct

A small proportion of suitable nesting habitat within a 1 km buffer around the OHTL route was not fully surveyed due to the inaccessibility of some sites along two steep river gorges. Therefore, the actual number of nesting birds may be slightly higher, assuming a couple of nests have been missed.

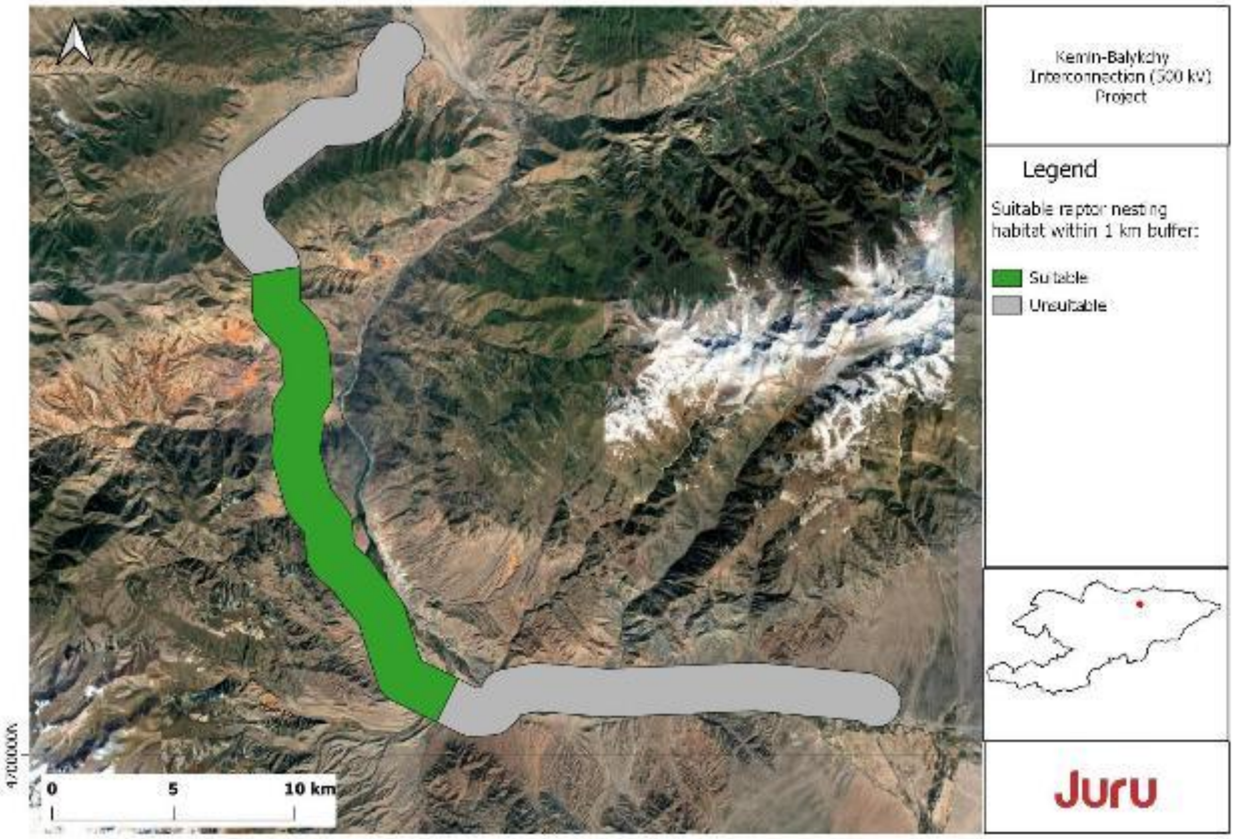
Another limitation is related to the seasonality of the surveys, as the behaviour of raptors and vultures varies throughout different stages of nesting, which affects their visibility.

During the surveys, 6 nests of 3 raptor species and an active roost of Himalayan Griffon were identified. All the species are listed by the IUCN and the Kyrgyz Red Book as LC or NT. The identified nests are all outside the OHTL ROW (30m on either side of the overhead conductor, with the nearest nest 205 metres from the OHTL).

Most of the area surveyed within a 1 km buffer around the OHTL and often beyond does not have suitable breeding sites for raptors or vultures, as the terrain is either too flat or without steep slopes and cliffs to provide structure for nests. There are hardly any trees in the area large enough to support nesting sites and no raptor nests were found on existing OHTL towers. All nests discovered during the surveys were built on rocks and cliffs, in niches or on shelves.

Less than 40% of the habitat within 1 km buffer around the OHTL route may be considered as suitable for raptor nesting (Figure 120). The remaining part of the project area does not have suitable habitat for nesting raptors, such as cliffs, steep slopes, rocks or large trees.

Figure 120: Area containing potentially suitable nesting habitat for raptors and vultures along the OHTL ROW, including 1 km buffer.

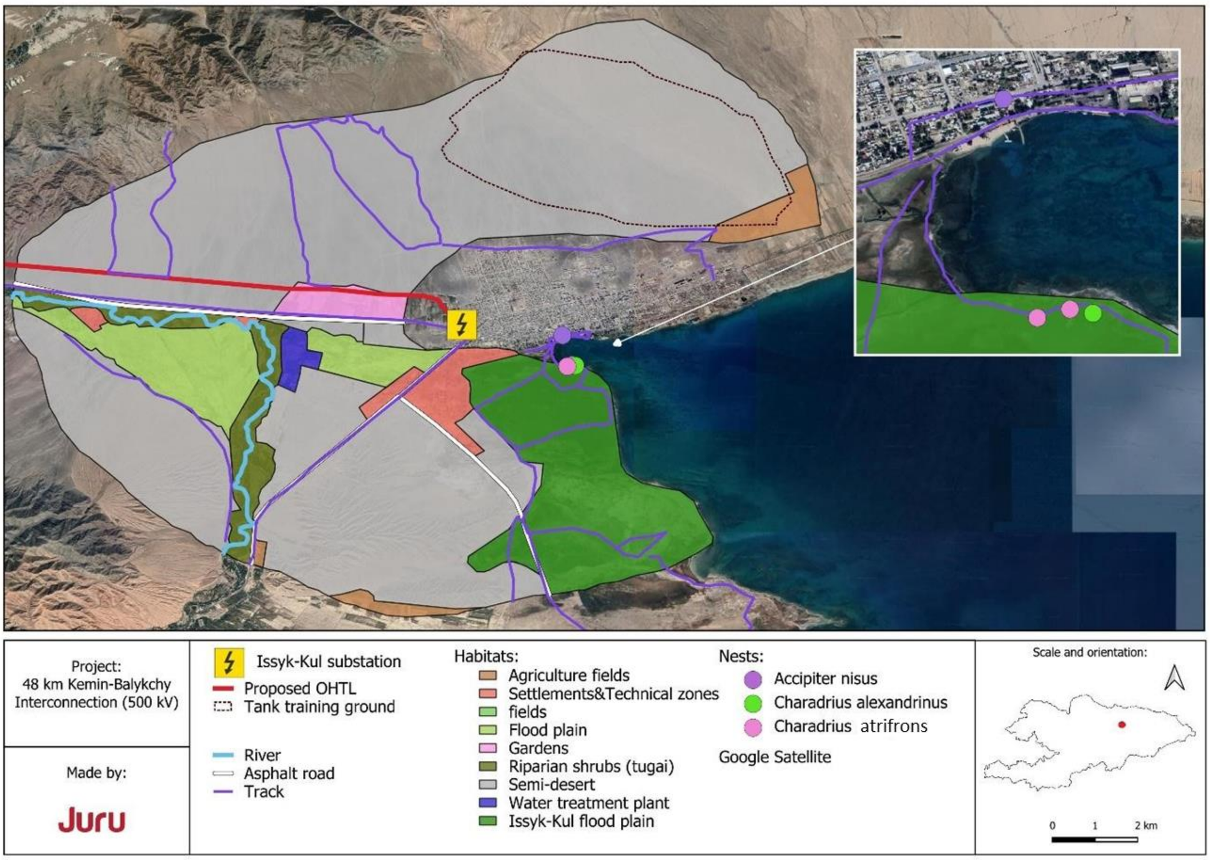


4.6.5.3 Breeding bird surveys

Surveys of breeding birds along walked transects in the area adjacent to the western shore of Lake Issyk-Kul were conducted in spring 2024, during 6 days between 26 April and 22 May 2024. This area is potentially suitable for the breeding of desert and waterbird species, including Pallas's sandgrouse, Asian short-toed lark, and several species of waders.

As the result of the survey, four nests of three bird species were found: one nest of Kentish Plover, one nest of Eurasian Sparrowhawk and two nests of Tibetan Sandplover. The plover nests were found close to the shore of the Lake Issyk-Kul, in close proximity to the Balykchy town, located 100-120 meters apart from each other. The nest of the sparrowhawk was found in a tree near a road in a populated area. During this survey, courtship activity of seven bird species was recorded in the area. Overall, 42 bird species were observed during the survey. In previous years, experts found nests of twenty species in the study area, including Eurasian Sparrowhawk, Eurasian Hobby, and Ferruginous Duck (RDB: NT; IUCN: NT).

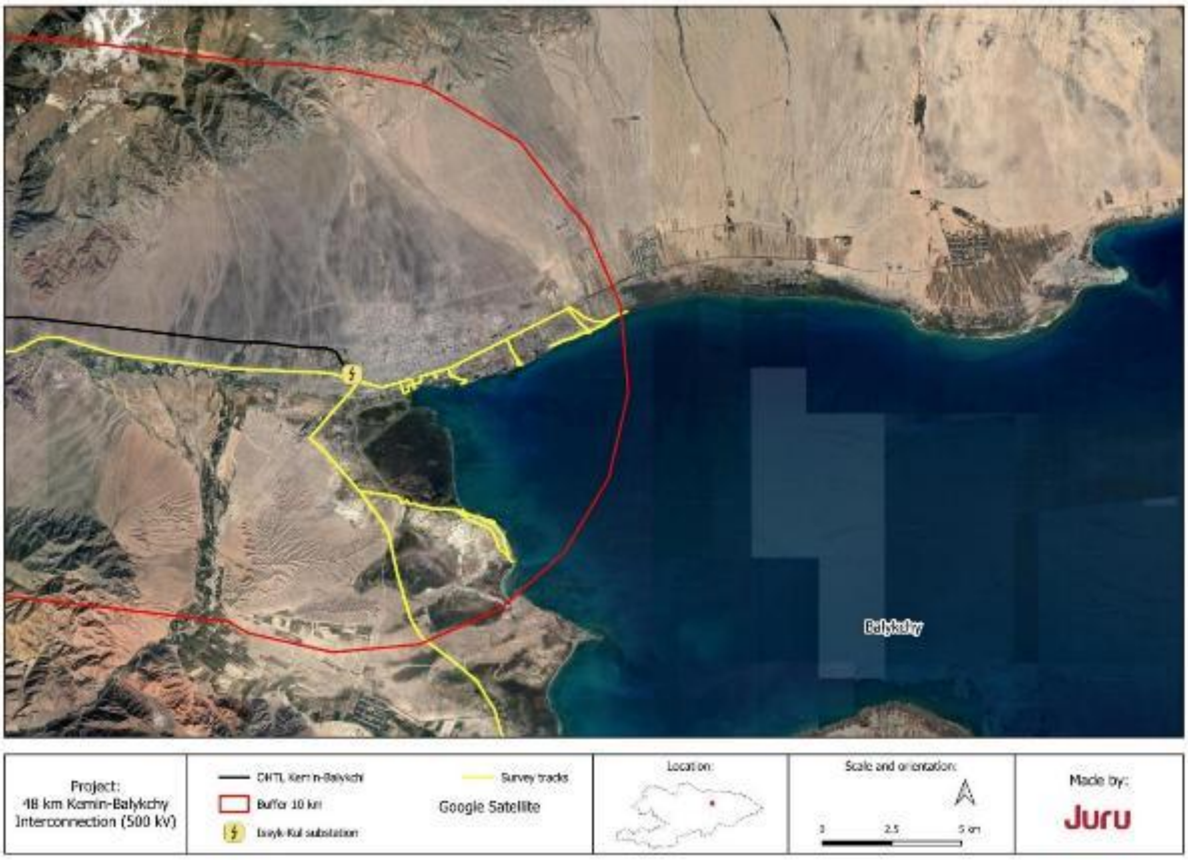
Figure 121: Territory covered by breeding bird surveys along the proposed OHTL route between Kemin and Balykchy in spring 2024



4.6.6 Winter waterbird survey

A winter waterfowl survey was conducted from December 2024 to February 2025 along the western shore of Lake Issyk-Kul, Kyrgyzstan. The survey was conducted for one day each month and the survey routes are shown in *Figure 122*. The survey focused on areas overlapping with the 10 km buffer zone of the OHTL route to assess potential impacts on waterbirds.

Figure 122: Access tracks used during winter waterbird surveys of the western bay of Lake Issyk-Kul in winter 2024/2025



As a result of the study, 29 bird species were documented over three-monthly surveys conducted in December, January, and February 2025. Four species observed during the study have elevated status either in the Red Data Book of Kyrgyzstan, the IUCN global red list of threatened species, or both:

- Whooper Swan (*Cygnus cygnus*) – IUCN LC, Kyrgyz Category VII (LC)
- Ferruginous Duck (*Aythya nyroca*) – IUCN NT, Kyrgyz Category VI (NT)
- Common Pochard (*Aythya ferina*) – IUCN VU, Kyrgyz unlisted
- Horned Grebe (*Podiceps auritus*) – IUCN VU, Kyrgyz unlisted

These four species, as well as numerous other waterbird species are known to be susceptible to powerline collisions. However, the habitat selection of these species is very strongly associated with open water, and they generally do not occur along the OHTL, as indicated by the results of both the winter waterbird surveys and the VP surveys along the lake shore and the OHTL (and see under "other migratory waterbirds" below).

4.6.6.1 Sensitive bird species

The CH/PBF assessment identified seventeen bird species and one multispecies category of birds to be PBF for the Project. No species triggered a CH determination.

Table 47: Summary of observations of potential CH-and PBF trigger species collected during baseline surveys for Kemin-Balykchy OHTL Project. Data presented in the table represent total numbers of observations for each species for each survey report, unless otherwise indicated (see footnotes). Only those surveys in which at least one observation of a potential CH feature or PBF occurred are included in this table.

Species	**Project-specific survey source**[114]					**Total Observations**
	1	**2**	**3**	**4**[115]	**5**[116]	
White-headed Duck *Oxyura leucocephala*						**0**
Demoiselle Crane *Anthropoides virgo*						**0**
Common Crane *Grus grus*						**0**
Sociable Lapwing *Vanellus gregarius*						**0**
Arctic Loon *Gavia arctica*						**0**
Great White Pelican *Pelecanus onocrotalus*						**0**
Dalmatian Pelican *Pelecanus crispus*						**0**
Bearded Vulture *Gypaetus barbatus*	2	15	17			**34**
Egyptian Vulture *Neophron percnopterus*						**0**
Cinereous Vulture *Aegypius monachus*	2	14	15			**31**
Himalayan Griffon *Gyps himalayensis*		51	15	1	1 (roost)	**68**

114 Note that the only baseline surveys included in this table are those in which at least one observation of a PBF was recorded within the Project's EAAA. Survey sources are numbered as follows:
1 = Bird Vantage Point (VP) surveys, autumn, 2024
2 = Bird Vantage Point (VP) surveys, spring, 2024
3 = Bird Vantage Point (VP) surveys, spring, 2025
4 = Raptor/Vulture nest surveys, 2024
5 = Raptor/Vulture nest surveys, 2025
6 = Botany surveys, 2024 + 2025
7 = Fish surveys, 2025
115 Numbers presented in this column represent number of active nests documented
116 Numbers presented in this column represent number of active nests documented

Species	Project-specific survey source[114]					Total Observations
	1	2	3	4[115]	5[116]	
Eurasian Griffon *Gyps fulvus*			10			**10**
Greater Spotted Eagle *Clanga clanga*						**0**
Steppe Eagle *Aquila nipalensis*	3		1			**4**
Imperial Eagle *Aquila heliaca*			1			**1**
Golden Eagle *Aquila chysaetos*	8	11	23		2	**44**
Saker Falcon *Falco cherrug*	1					**1**

White-headed Duck (IUCN EN; Kyrgyz EN)

OHTL collision susceptibility is presumed high, similar to that of other large-bodied waterbirds. This species is a rare breeder on small ponds/lakes in the region, and is also known to winter in small numbers on Lake Issyk-Kul. There are recent eBird winter records of up to 6 individuals at several bays on Lake Issyk-Kul, and recent summer records, indicating breeding activity at several small lakes north of Almaty, Kazakhstan. Thus, this species is considered a possible rarity within the region year-round, and small numbers may migrate across the OHTL. There were no records of this species documented during the Project's baseline studies, including wintering waterbird counts in the westernmost portion of Lake Issyk-Kul, and we note that this is not a trigger species for the Western Issyk-Kul Lake IBA. Therefore, this species does not trigger CH, as the EAAA is not likely to hold 26 or more individuals (criterion 1a) or hold a nationally significant concentration (criterion 1c).

Cranes

Two species of cranes, Demoiselle Crane (IUCN LC; Kyrgyz NT) and Common Crane (IUCN LC, Kyrgyz unlisted) may potentially occur at the project site during migration. As a general rule, cranes are one of the bird taxa known to be highly susceptible to collisions with OHTL. Both species occur in the Project region primarily as migrants, with no breeding records in the vicinity of the project site. On the eastern shore of Lake Issyk-Kul, over 160 km east of the Project area, there are eBird records of up to 2,000 Demoiselle Cranes and up to 23 Common Cranes. However, there are no eBird records of this species on the western shore of Lake Issyk-Kul (closer to the Project area), and this species is not associated with the Western Issyk-Kul IBA. Despite intensive vantage point survey efforts along the OHTL route during both spring and autumn migration season, these species were never observed in the Project area during the baseline studies, indicating that the Project is not located within a primary migration corridor of this species, and the number of birds present within the Project's EAAA would never exceed 2,300 and 4,190 individuals for Demoiselle and Common cranes respectively, required to trigger a CH determination under criterion 4.

Sociable Lapwing (IUCN CR; Kyrgyz CR)

The Sociable Lapwing is a large shorebird (wader) that breeds in grassland/steppe habitats in Eurasia, from central Kazakhstan and northward, and winters primarily in India and the Arabian Peninsula. In the Project region, there are only a very small number of eBird records, all during spring migration, and all consisting of 2 individuals. It was not observed during the Project's baseline studies, but it could occur as a very rare migrant, when it could be exposed to the risk of collision with the OHTL, especially during its nocturnal migratory flights. Based on this information, it is assessed as not triggering CH, as it is highly unlikely that the Project's EAAA would ever contain a minimum of 56 individuals (criterion 2a) and the area does not hold a nationally important concentration (criterion 2c).

Arctic Loon (IUCN LC, Kyrgyz CR)

This heavy-bodied waterbird may be susceptible to collisions with OHTL. This globally abundant and widespread loon species is listed as CR in Kyrgyzstan because several pairs historically nested in bays in the eastern portion of Lake Issyk-Kul. However, even at the time of the latest edition of the Kyrgyzstan red data book (2006), this species had not nested in the Lake in recent years. It is not a trigger species for the western Lake Issyk-Kul IBA, and was not observed during the Project's baseline studies. Therefore, it is assessed as not triggering CH, as the Project's EAAA does not contain a nationally important concentration (criterion 2c) and the EAAA is unlikely to ever contain in excess of 2,750 individuals (criterion 4).

Pelicans

Two species of pelicans, Great White Pelican (IUCN LC, Kyrgyz NT) and Dalmatian Pelican (IUCN NT, Kyrgyz VU) may potentially occur in the area during migration. As a general rule, pelicans are highly susceptible to collisions with OHTL, likely due to their large size and poor manoeuvrability. Both species are present in the Project region only as rare migrants, with small numbers recorded at wetlands, predominantly in the northern part of the Chui Province. There are no records of these species from Lake Issyk-Kul in the eBird database, it was not observed during the Project's baseline surveys and it is not a trigger species for the Western Lake Issyk-Kul IBA. Therefore, it is assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain more than 2,650 individuals (criterion 4) or 114 individuals for Great White and Dalmatian Pelicans, respectively.

Vultures

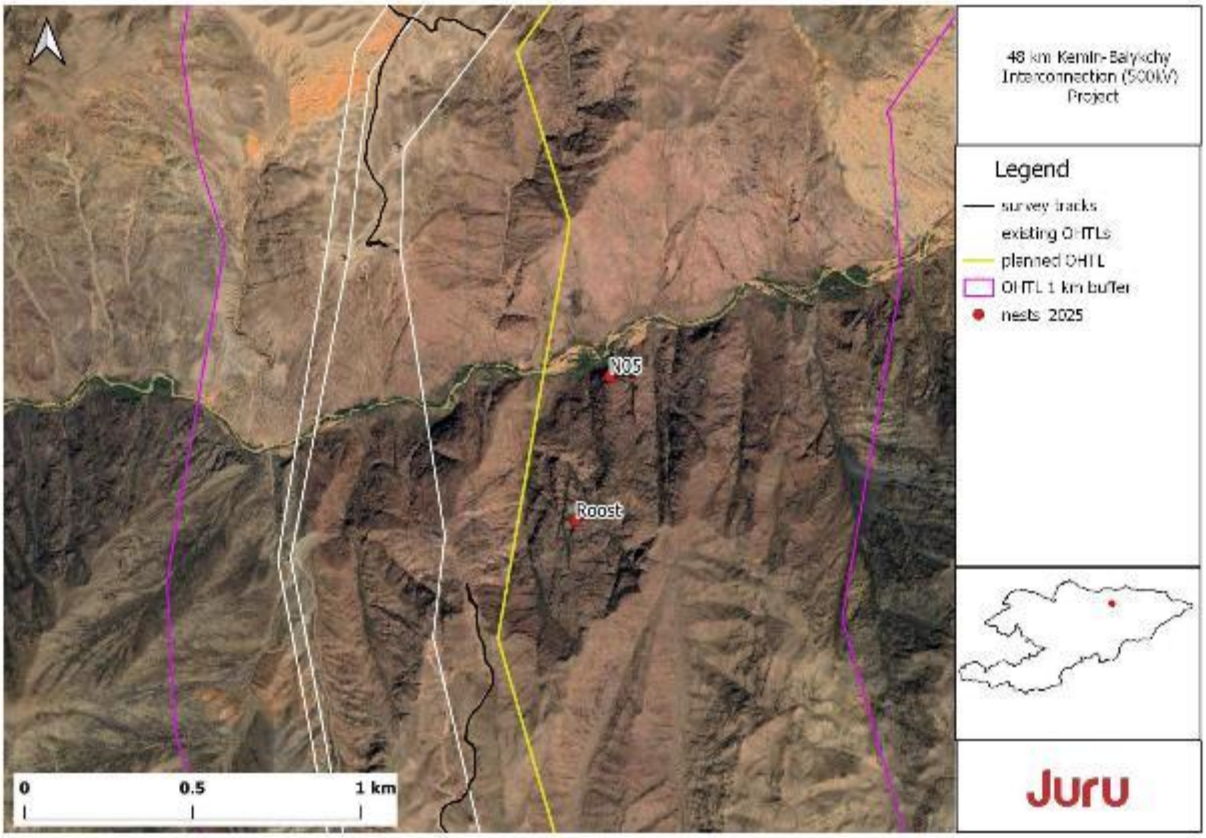
Bearded Vulture (IUCN NT, Kyrgyz NT) This is a very large vulture that feeds on bones of dead animals, and that may be susceptible to either collisions or electrocution impacts from the Project. It is known to be a year-round resident in the Project region, with a large number of eBird observations from the area, as well as a total of 34 observations recorded during the Project's baseline studies, indicating that this species is a common, though low-density resident of the

Project area. There is no potential CH trigger for this species, but it is considered to trigger PBF criterion iii due to its large size, iconic nature, and national protected status.

Egyptian Vulture (IUCN EN, Kyrgyz VU) This is a smaller vulture, still quite a large bird, with a wider dietary range than many other vultures, often feeding at rubbish dumps as well as on drier carrion, and often relying to a significant degree on live prey, including tortoises. It could potentially be susceptible to either collision or electrocution impacts from the Project. It is present in Kyrgyzstan only during the warmer months, when it nests on bluffs and cliffs in low-lying desert mountains. This species was not observed during the Project's baseline studies, but a handful of eBird records from the Project region, including one from one of the gorges through which the Project's OHTL passes, suggest that this species may be present, though rare, in the Project area. Nonetheless, it is assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain in excess of 62 individuals (criterion 2a).

Himalayan Griffon (IUCN NT; Kyrgyz LC) Similar to the previous species with regard to presumed OHTL impact susceptibility and conservation sensitivity, this species is also common in the Project area, as reflected by the Project's baseline survey results (68 total observations), numerous eBird observations, and summary information in the Kyrgyzstan Red Data Book. This species is a year-round resident in the Project region, and during the Project's baseline surveys, one active nest was found in the Project area in 2024, and a roosting site was found in April 2025, located 170 m east of the planned OHTL line (Figure 123). Although no nests were found in 2025, the presence of a roost is possibly indicative of nesting activity in the area. There is no potential CH trigger for this species, but it is considered to trigger PBF criterion iii due to its large size, iconic nature, and international red-listed status.

Figure 123: The location of a Gyps himalayensis roost site and "unknown" nest N05 in relation to the existing and planned OHTLs.



Cinereous Vulture (IUCN NT, Kyrgyz NT) This is a very large vulture with a moderate level of OHTL collision and electrocution susceptibility and moderate conservation sensitivity. This species primarily occurs in the Project region as a migrant, but it may also be present as a scarce breeder, or even in winter, as evidenced by observation of a pair of birds in Boom Gorge, right along the Project's OHTL route, from January, 2024. During the Project's baseline surveys, 31 observations of this species were collected, with roughly equal numbers of observations in spring and autumn migratory periods, indicating that it is a regular migrant through the Project area. Nonetheless, it is assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain in excess of 168 individuals (criterion 4).

Eurasian Griffon (IUCN LC, Kyrgyz NT) This species is similar in most respects to the previous two species. The conservation sensitivity is one tick lower than Cinereous Vulture or Himalayan Griffon at the international level, but the same as Cinereous Vulture (NT) at the national level. Similar to Cinereous Vulture it primarily occurs in the region as a migrant, and it was recorded in smaller numbers during the Project's baseline surveys, and only during spring migration (10 observations). These numbers are far below the minimum of 800 individuals that would be required to occur within the EAAA to trigger a CH determination under CH criterion 4, hence this species is assessed as not triggering CH.

Eagles

Greater Spotted Eagle (IUCN VU Kyrgyz NT) This is a wetland-associated eagle that occurs in the Project region only as a rare migrant. Eagles are well-known to be susceptible to electrocution impacts from OHTL, though such impacts are generally less severe with high voltage OHTL than they are with lower voltage distribution lines Eagles, including Greater Spotted Eagle, may also be susceptible to collisions with powerlines, though their excellent visual capabilities and lower wing-loading generally render them less susceptible to such impacts than are heavier bodied birds and birds with poorer vision . There are no eBird records of Greater Spotted Eagle in the immediate Project region, and only a small handful in the region north of Almaty, Kazakhstan, indicating that small numbers could pass through the Project region. It was not observed during the Project's baseline studies. Therefore, it is assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain in excess of 390 individuals (criterion 4), and the Project is not likely to cause the species' uplisting to globally EN/CR (criterion 2b).

Steppe Eagle (IUCN EN, Kyrgyz NT) Similar to the previous species, this large, migratory eagle is generally present in the region only as an uncommon migrant, though Steppe Eagle is more common, has been recorded on several occasions in the Project region in the eBird database, and was observed during the Project's baseline studies both during spring (1 observation) and autumn (3 observations). OHTL impact susceptibility is presumed to be similar to that of other eagles, and this species, specifically, is known to be susceptible to electrocution impacts on power lines in Kyrgyzstan. Based on this species' scarcity in the Project region, it is assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain in excess of 250 individuals (criterion 2a).

Imperial Eagle (IUCN VU, Kyrgyz VU) Similar to the previous species, this large eagle has a similar risk profile for the Project in most respects, including the likelihood that it will occur in the Project area exclusively during migration seasons, especially autumn. Species eBird records in the Project region are far fewer than for Steppe Eagle, and there was only one observation of this species recorded during the Project's baseline surveys (a spring observation). Based on this species' scarcity in the Project region, it is assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain in excess of 25 individuals (criterion 4), and the Project is unlikely to result in this species' uplisting to globally CR/EN (criterion 2b).

Golden Eagle (IUCN LC, Kyrgyz NT) A congener of the previous two species, this is the most globally widespread of the three, with the largest global population size (85,000) and the lowest conservation sensitivity. However, unlike the previous two species, it is a year-round resident within the Project region, with two active nests in the Project region documented during the Project's baseline studies, and it is also much more abundant, as reflected in the large number of eBird records for the Project region, and the larger number of baseline study observations (44 total observations). In spite of its higher abundance, it is nonetheless assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain more than 850 individuals (criterion 4).

Saker Falcon (IUCN EN, Kyrgyz EN)

This species has the highest conservation sensitivity of any falcon potentially occurring in the Project area, and it is a species with known susceptibility to power line electrocution impacts. This species is a year-round resident and also partially migratory in the Project region, and was represented by a single observation during the Project's baseline surveys, during autumn migration. Due to this species' scarcity in the Project region, it is assessed as not triggering CH, as the Project's EAAA is unlikely to ever contain more than 61 individuals (criterion 2a), and the Project area does not contain a nationally important concentration of this species (criterion 2c).

Other migratory waterbirds

In addition to the migratory waterbird species individually considered as PBF for the Project and listed above, a wide variety of additional waterbird species could potentially occur within the Project area, and are collectively considered a PBF under EBRD PBF criterion iii, as substantial collision fatality levels would be of concern to a broad set of scientific and conservation stakeholders, were they to occur. Included in this multispecies category are many species of "waders" (British) or "shorebirds" (American), in the order Charadriiformes, as well as numerous ducks, geese and swans (order Anseriformes), gulls and terns (order Charadriiformes), grebes (order Podicipediformes), cormorants (order Pelecaniformes), rails and allies (order Gruiformes), and storks, herons, ibis and allies (order Pelecaniformes). Such species generally have high susceptibility to collisions with high-voltage power transmission lines. Most species in this category are restricted to, or highly associated with coastal habitats or wetlands and waterbodies, thus limiting exposure of this group to risk from the upland and inland habitats of the Project area, noting that the eastern terminus of the line is located 6.8 km from the western shore of Lake Issyk-Kul, hence the Lake, itself, is not included within the Project's EAAA for waterbird species. Nonetheless, the OHTL route generally follows a river, which may provide habitat for some water birds, and many species' migratory flights can occur anywhere over land or water. The species in this category that have both high conservation sensitivity, and likely regular occurrence in the vicinity of the Project area have been identified individually as PBF for the Project and are discussed in species-specific sections above, but additional species, including some species with elevated conservation status (e.g., Common Pochard, Horned Grebe) could be subsequently added to the list of PBF for the Project if collision impacts are detected. The Project's baseline surveys included some bird survey elements conducted inside of the Project's EAAA for waterbirds, notably the VP surveys, and some survey elements that were conducted primarily or entirely outside of it, in habitats where water birds may occur along the shoreline habitats and the western waters of Lake Issyk-Kul, notably the breeding bird surveys and the winter water bird surveys. In surveys conducted along the OHTL route, very few water birds were observed. For example, in the autumn VP surveys at points 1-7 along the OHTL, a total of 36 observations of 8 species of waterbirds were collected, with a maximum of 9 observations for any one species, all pertaining to very abundant, widespread species with no red list status. By contrast, at a single VP (#8), located along the shore of Lake Issyk-Kul in the same season, 400 waterbird observations from 20 species were recorded, including one species with elevated red list status (Ferruginous Duck IUCN NT, Kyrgyz NT). A similar pattern occurred on the VP surveys in spring, when lakeshore VP #8 was surveyed along with 7 VP located along the OHTL route. In spring 2025, when VP surveys were conducted at 4 points all located along the OHTL, zero observations of waterbirds were collected. In the winter waterbird surveys conducted along the shore of Lake Issyk-Kul, a total of 4,339 observations of 29 waterbird species were collected, including observations of two additional red-listed species (Common Pochard IUCN VU, Kyrgyz unlisted; Horned Grebe IUCN VU, Kyrgyz unlisted). Based on these observations, it is clear that while a wide variety and high abundance of waterbirds occur in Lake Issyk-Kul, a much lower diversity and abundance of waterbirds is present in the upland and riparian habitats along the Project's OHTL, and within the Project's EAAA. Therefore, there are no species in this category that trigger a CH determination, which would require that at least 1% of the species' global population occurs within the EAAA (criterion 4). Nonetheless, because of the potential for the Project to generate impacts on this set of birds that could be of concern to a broad set of stakeholders, particularly during migratory flights, this set of birds is classified as a PBF under criterion iii.

4.6.7 Reptiles and amphibians

Kyrgyzstan has limited herpetofauna diversity due to its physical and climatic conditions. The region is dominated by high mountains with harsh climate conditions, which is unfavorable for thermophilic amphibians and reptiles.

The Reptile Database[117] documents 12,263 reptile species globally, with over 250 species found in Central Asia and only 37 occurring in Kyrgyzstan. While approximately 8,500 amphibian species exist worldwide, only four species have been documented in Kyrgyzstan. Despite this limited diversity, Kyrgyzstan harbours endemic and relict species that are threatened with extinction. One of these, the marsh frog *Pelophylax ridibundus*, is believed to have migrated from the northwest, probably facilitated by human activity. These species require protection under the Convention on Biological Diversity, adopted in Rio de Janeiro in 1992 and ratified by Kyrgyzstan in 1996.

Based on literature reviews and field observations from previous years, a list of reptile and amphibian species that are potentially present within the project ROW was compiled (see Table 48).

117 http://www.reptile-database.org/ accessed 8 July, 2025

Table 48: A list of reptile and amphibian species that may potentially occur with the project site[118]

№	Class	Family	Species	Common name	IUCN Red List	Kyrgyzstan Red Data Book
1	**Amphibia**	Bufonidae	*Bufotes viridis*	European green toad	LC	VU B2ab
2		Ranidae	*Rana asiatica*	Asiatic Frog	VU	VU B1ab
3	**Reptilia**	Anguidae	*Pseudopus apodus*	European Glass Lizard	LC	NT
4		Gekkonidae	*Mediodactylus russowii*	Transcaspian Bent-Toed Gecko	LC	Not listed
5		Lacertidae	*Eremias arguta* darevskii	Racerunner Darevskii	LC	Not listed
6		Lacertidae	*Eremias velox borkini*	Central Asian racerunner	LC	Not listed
7		Lacertidae	*Eremias stummeri*	Stummer's Racerunner	LC	Not listed
8		Scincidae	*Ablepharus desertii*	Desert Lidless Skink	LC	Not listed
9		Colubridea	*Elaphe dione*	Steppes Ratsnakes	LC	Not listed
10			*Hemorrhois ravergieri*	Spotted Whip Snake	LC	Not listed
11			*Psammophis lineolatus*	Steppe ribbon racer	LC	Not listed
12			*Natrix tessellata*	Dice Snake	LC	Not listed
13		Vepiridae	*Vipera renardi* tienshanica	Eastern Steppe Viper	NT	VU A4bc
14		Crotalidae	*Gloydius caraganus*	Karaganda pitviper	LC	Not listed

Surveys aiming to document species composition and density, territorial distribution, areas of potential concentration, and the overall likelihood of reptile and amphibian habitats within the study area took place in autumn 2024 and in spring 2025.

During a field survey conducted from 20 to 23 September 2024, the status of reptiles along the original OHTL route was assessed, with 25 km of walked transects completed. In spring 2025, the surveys were conducted on April 24–25, with a total distance of approximately 22.5 km of transects walked.

118 Note: **IUCN** – species included in the Red List of the International Union for Conservation of Nature (EN – endangered; LC – least concern; VU- vulnerable); **Red book of Kyrgyzstan**: **B1**: A very restricted extent of occurrence (EOO), estimated to be less than 5,000 km^2, **a:** Severe fragmentation or the species exists at very few locations, **b**: Continuing decline in: (i): Extent of occurrence (EOO), (ii): Area of occupancy (AOO), (iii): Quality of habitat, (iv): Number of locations or subpopulations, and (v): Number of mature individuals. **B2:** A very restricted area of occupancy (AOO), estimated to be less than 500 km^2; **VU A4:** A population reduction of at least 30% (Vulnerable) over a time frame, including past and future trends (up to three generations or 10 years, whichever is longer): **b:** The causes of decline are understood and relate to: A decrease in the area of occupancy (AOO) or extent of occurrence (EOO), Habitat quality deterioration, or Exploitation (e.g., hunting or collection); **c:** The decline in population is due to specific threats like habitat destruction, fragmentation, or environmental changes.

Figure 124: Reptile survey tracks along the Kemin-Balykchy OHTL ROW, April 2025.

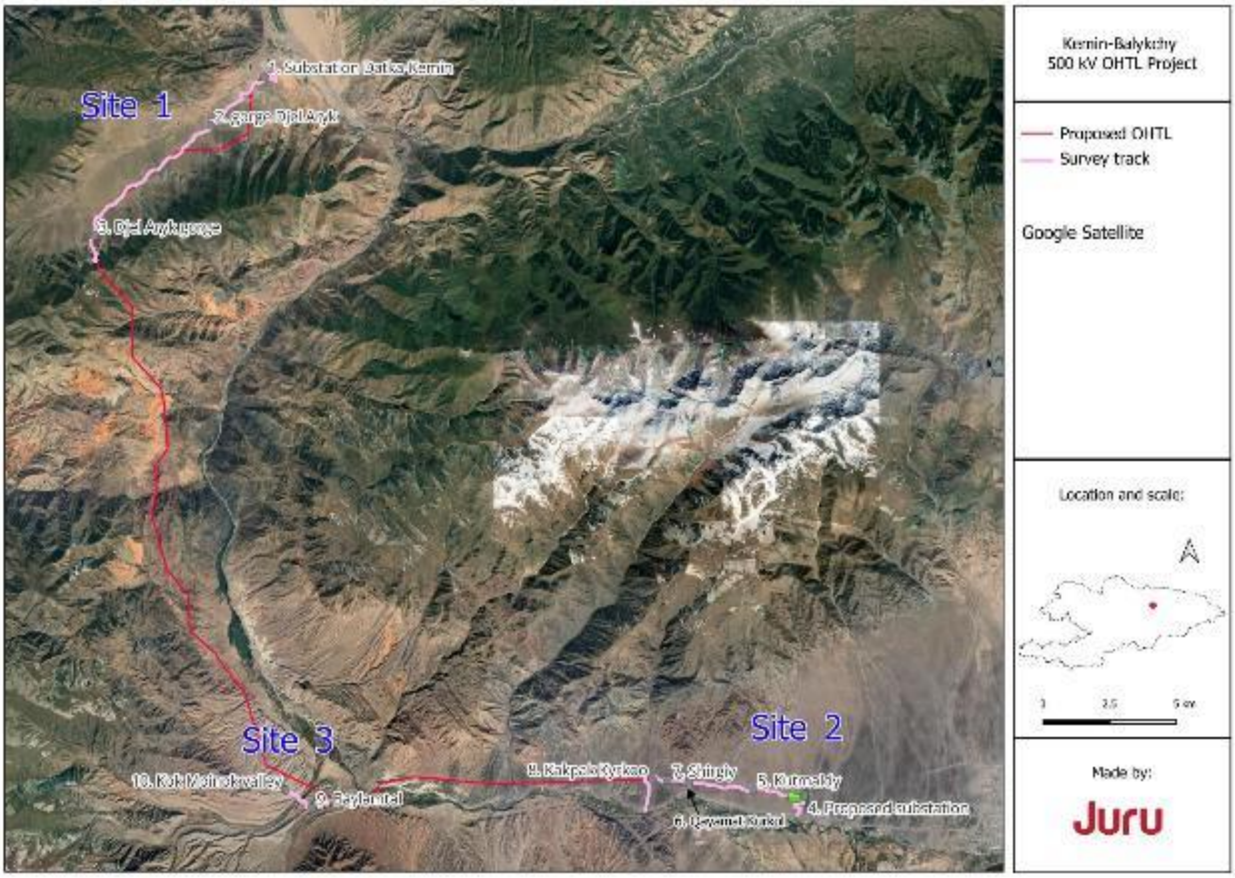


Table 49: Main locations of reptile survey tracks

№	Area	Site #	Coordinates		Length (km)
			N	E	
1	Datka-Kemin Substation	1	42.70902	75.83288	2,67
2	Zhel Aryk Gorge	1	42.69267	75.80862	6,20
3	Zhel Aryk Gorge	1	42.65568	75.75532	2,16
4	Solar Substation	2	42.46737	76.07878	2,1
5	Kutmaldy Area	2	42.4698	76.05565	2,44
6	Kayamat Kurkol Area	2	42.47205	76.02628	2,46
7	Shirgiy Area	2	42.47293	76.01685	1,0
8	Kakpak Kyrkoo Area	2	42.47337	76.00955	1,0
9	Baylamtal Area	3	42.46377	75.8548	1,43
10	Kok-Moynok Valley	3	42.4697	75.8427	0,98
		In total:			22,5

Seven reptile species and no amphibians were recorded during the spring and autumn herpetological surveys, totalling 181 observations (Table 50). One species among them — the

Eastern steppe viper is listed as protected under the IUCN Red List (Near threatened) and the Kyrgyzstan Red Data Book (Vulnerable) and was recorded once during spring surveys.

Table 50: Number of reptile observations recorded during autumn 2024 and spring 2025 surveys along Kemin-Balykchy OHTL ROW

№	Species (English name)	Species (scientific name)	IUCN status	Kg RDB status	Autumn 2024	Spring 2025
1	Alay eyelid skink	*Asymblepharus alaicus*	LC	-		19
2	Steppe runner	*Eremias arguta*	LC	-	2	6
3	Eastern steppe viper	*Vipera renardi*	NT	VU A4bc		1
4	Stummer's racerunner	*Eremias stummeri*	LC	-	32	70
5	Central Asian Racerunner	*Eremias velox*	LC	-		47
6	Common pit viper	*Gloydius halys*	LC	-	1	2
7	Spotted Whip Snake	*Hemorrhois ravergieri*	LC	-	1	

Among reptiles listed in the Red Data Book of Kyrgyzstan, only the Eastern steppe viper was recorded; however, its population density is low. The most frequently observed species along the Kemin–Balykchy OHTL route are the Stummer's racerunner (*Eremias stummeri*) and Central Asian racerunner (*Eremias velox*). No IUCN VU or above species were identified or considered likely to be present. Only a single species of reptile or amphibian, the Asian Frog, satisfied the requirements to be considered a potential CH/PBF trigger for the Project. Although it was not observed during surveys, its presence along the Chu River is still likely.

Asian Frog (IUCN VU, Kyrgyz VU) This frog species inhabits a wide variety of mountain, steppe, and desert habitats within its central Asian range, and could potentially occur within the Project's EAAA, especially in wetland and wooded habitats along the Chu River and tributaries. However, it was not detected during the Project's baseline study, suggesting that the Project is not likely to cause this species' uplisting to globally EN/CR. Additionally, the proposed OHTL is expected to have a minimal effect on areas adjacent to rivers, and thus will unlikely affect the species which inhabit these habitats. Therefore, CH is not triggered for this species (criterion 2b).

4.6.8 Mammals

After conducting extensive literature research, analysis of open-source databases and consultations with local experts, the potential presence of around 70 mammal species was expected within the 50 km buffer area around the proposed OHTL route. These include two globally threatened mammals, Snow Leopard (IUCN VU, KG RDB CR), Marbled Polecat (IUCN VU, KG RDB CR), as well as 2 additional species with elevated conservation status in the Red Data Book of the Kyrgyz Republic (*Table 51*).

We note that Goitered Gazelle has been excluded, as this species has been extinct in the Kyrgyz Republic since the 1970s, and only recently, a species re-introduction initiative has started, with the first few individuals currently kept in enclosures at a site along the southern shore of the Lake Issyk-Kul (Ilbirs Foundation, unpublished data).

Table 51: Species of mammals potentially occurring within the Project area.

Latin name	Common name	IUCN status	Kyrgyz Republic RDB Status
Panthera uncia	Snow Leopard	VU	CR
Vormela peregusna	Marbled Polecat	VU	CR
Neomys fodiens	Eurasian Water Shrew	LC	NT
Tadarida teniotis	European Free-tailed bat	LC	LC
Martes foina	Beech Marten	LC	LC
Lynx lynx	Eurasian Lynx	LC	NT
Hystrix indica	Indian Crested Porcupine	LC	LC
Allactaga elater	Small Five-toed Jerboa	LC	LC
Allactaga sibirica	Siberian Jerboa	LC	LC
Allactaga severtzovi	Severtzov's Jerboa	LC	LC

Although there is potentially suitable habitat for the Marbled Polecat around Project ROW, the latest observations (last decades) of the species in the country are anecdotally limited to the western part of the Chu Valley and foothills of the Chatkal Mountain Range in the west of the country (Red Data Book of Kyrgyz Republic 2006).

The Snow Leopard is likely to be found at higher elevations within the mountain ranges to the east and west of the project area. Although the chances of the species crossing the proposed routes are small, there is anecdotal evidence that a snow leopard was seen crossing the EM11 road at night (Snow Leopard Foundation, unpublished data). Snow Leopards have also been recorded on camera traps on both sides of the Boom Gorge, with the nearest confirmed record 25 km to the west of the OHTL route (Snow Leopard Foundation, unpublished data). Therefore, it is likely that some individuals cross the gorge, especially at night in winter, when road traffic is weak and the water level in the Chu River is low.

To assess the impact of linear objects on mammals, surveys were carried out along walked transects between April 3 and 6, 2025. The transects were planned to be evenly distributed along the OHTL route and to cover all key types of habitats present in the area. For each transect, observations of mammals, their burrows, tracks, faeces, and other signs of mammals' activity were recorded. The survey strip was set at 50 m on each side of the transects (for visual observations and burrows); however, searching for tracks and other signs of activity was limited to 2-3 m on both sides of the transects, due to predominantly stony substrate.

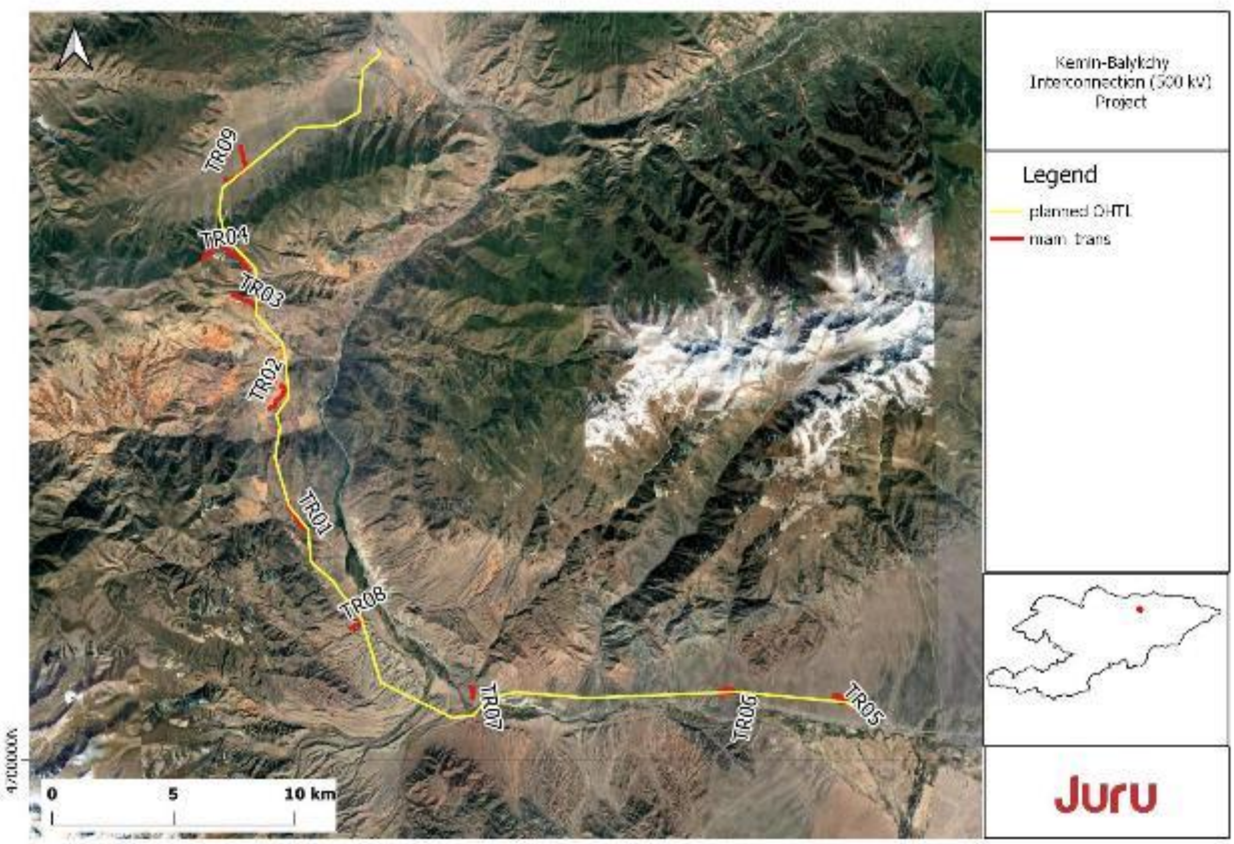
Mammal surveys were conducted along 9 walked transects with a total length of 13.3 km, which represents 24.6 % of the OHTL length (53.9 km) (Table 52). The transects were evenly distributed along the OHTL and covered key habitat types along the route and were representative of the substation site, including flat stony semi-desert along the eastern section, clay foothills, higher altitude areas in the central part, and alpine grassland along the northwestern section of the route (

Figure 125).

Table 52: Details of mammal transects surveyed in April 2025 along the proposed Kemin-Balykchy OHTL route

Transect ID	Date	Lat Start	Long Start	Lat End	Long End	Length (km)
1	03.04.2025	42.545245	75.788641	42.534972	75.796983	1.5
2	04.04.2025	42.580263	75.779082	42.588545	75.785033	1.4
3	04.04.2025	42.622758	75.761151	42.618213	75.771716	1.1
4	04.04.2025	42.636371	75.746627	42.631369	75.769644	3.1
5	05.04.2025	42.470372	76.061283	42.470372	76.061283	1.3
6	05.04.2025	42.473226	76.010572	42.473226	76.010572	1.6
7	05.04.2025	42.476305	75.878587	42.472275	75.879837	0.7
8	05.04.2025	42.498340	75.818796	42.500372	75.823823	0.5
9	06.04.2026	42.665190	75.758115	42.677221	75.765723	2.1

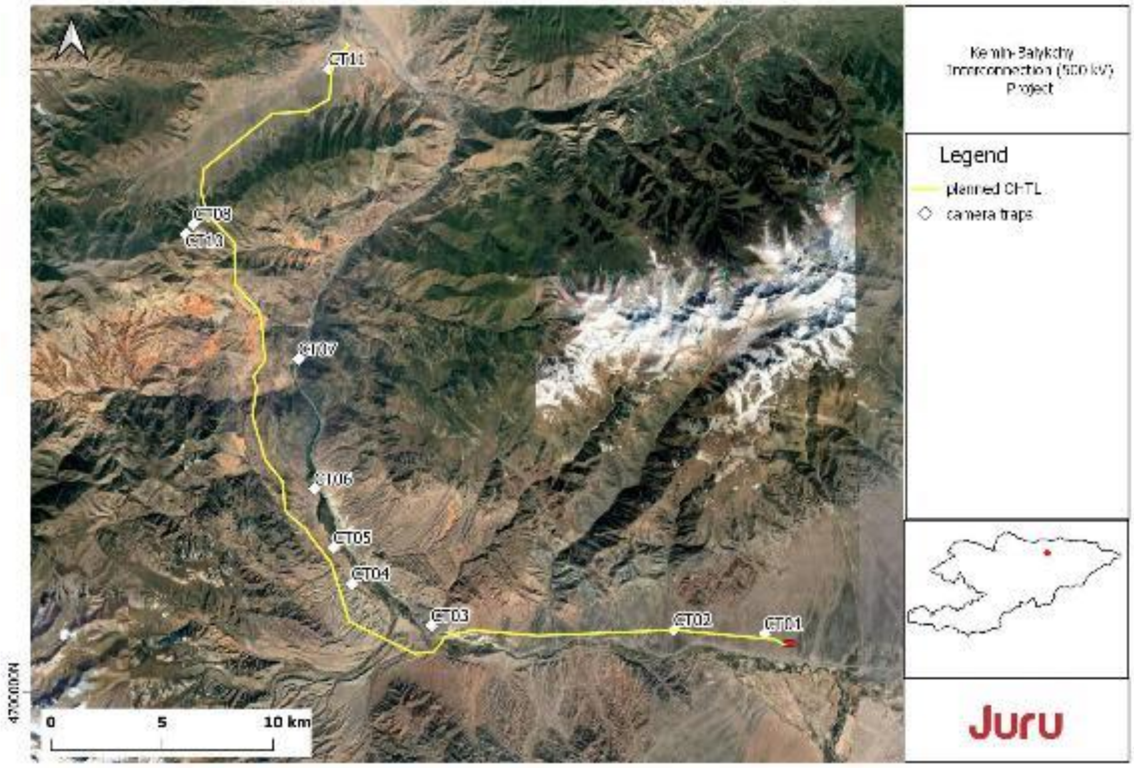
Figure 125: Locations of walked transects used to survey mammals along the proposed OHTL.



Additionally, 10 camera traps (Spypoint Force-48 and Bushnell Core 24 MP) were installed on November 13 and 14, 2024, and on January 15, 2025[119] (refer to Figure 126). Since the Project site is easily accessible and used by people for grazing, fishing, hunting, and tourism, camera trap locations were chosen to balance optimal wildlife detection and concealment from humans. The traps were set up to cover major habitat types (high mountains, stony desert, riverine forest and clay foothills) to try to find evidence of the site.

119 During the route options appraisal, the preferred route was significantly changed along the northwestern section of the OHTL, requiring three of the camera traps installed in November 2024 to be moved to the northwestern section of the final route in January 2025.

Figure 126: Locations of camera traps set up for mammal surveys



Camera traps were placed along the planned OHTL route to try to confirm desktop review and unpublished data sets for the snow leopard and other mammal species.

<u>Walked transects</u>

Walked transect surveys resulted in only two visual observations of mammals, Altai Marmot *Marmota baibacina* (TR04) and Tolai Hare *Lepus tolai* (TR06) (Table 53). A total of 10 Altai Marmots were observed within a loose colony stretched for several hundred meters along the existing OHTL service road, which is adjacent (300 m) from the proposed OHTL ROW, totalling approximately 80 burrows (both active and inactive). A Tolai Hare was observed leaving its shelter and running away.

In addition, various signs of activity of six mammal species were recorded, including faeces, tracks, and burrows (Table 53). None of the species that were identified have elevated conservation status on the IUCN Red List or the Kyrgyz Red Data Book.

A colony of a Gerbil species recorded in stony semi-desert (TR06) likely belongs to Tamarisk Gerbil *Meriones tamariscinus* (IUCN LC), as according to IUCN, this is the only species found in the semi-deserts surrounding Issyk-Kul Lake. However, as this species normally inhabits wetter, more vegetated habitats, this identification is not confirmed and may require further surveys. Examples of observations recorded during transects are presented in the images below (Figure 127).

Figure 127: Examples of activity signs recorded during walked mammal transects along the proposed OHTL ROW (from top left clockwise: Red Fox footprint; Red Fox faeces; Altai Marmot by its burrow; Tolai Hare faeces)

Table 53: Results of mammal transect surveys along the Kemin-Balykchi OHTL conducted between 3 and 6 April 2025

Species		IUCN status	KG RDB status	Transect ID								
English name	Scientific name			1	2	3	4	5	6	7	8	9
Tolai Hare	*Lepus tolai*	LC	unlisted	faeces, tracks (x4)	-	faeces (x5)	-	-	visual (x1), shelter (x1), faeces (x8)	-	-	-
Red fox	*Vulpes vulpes*	LC	unlisted	-	tracks (x3), faeces (x1)	faeces (x1)	tracks (x1)	-	-	-	-	-
Altai Marmot	*Marmota baibacina*	LC	unlisted	-	-	burrows (x15)	visual (x10), burrows (x80)	-	-	-	-	-
Long-eared Hedgehog	*Hemiechinus auritus*	LC	unlisted	-	-	-	-	-	faeces	-	-	-
Gerbil sp.	*Meriones tamariscinus* - Not confirmed	LC	unlisted	-	-	-	-	-	burrows (x10)	-	-	-
Beech Marten	*Martes foina*	LC	LC	-	-	-	-	-	faeces	-	-	-

Camera trapping

Out of 10 camera traps initially set up in November 2024, two (CT06 and CT09) were stolen before the memory card replacement visit in January 2025, while one more (CT05) was stolen after that, which meant that some images from the latter were obtained. Camera traps CT08, 09, 10 were set up in January 2025 after being moved from their initial locations along a previous route variation along the north-western section. As a result, a total of seven camera traps were retrieved between 03 and 06 April 2025, resulting in data from nine camera traps. The activity duration of retrieved camera traps varied from 2 to 6 months, depending on when they were set up and whether some stopped working for technical reasons. The details for each camera trap are presented in Table 54, only presenting data from camera traps set up along the final route option.

Table 54: Coordinates and other details of camera traps set up along the planned OHTL ROW.

Camera ID	N	E	Set date	Active (months)	Habitat

CT01	42.471283	76.060850	13.11.2024	6	Dry river bed (wadi) in a flat area of stony semi-desert
CT02	42.473389	76.011214	13.11.2024	2	Dry river bed (wadi) on slightly elevated alluvial plain, stony semi-desert
CT03	42.476196	75.878546	13.11.2024	4	Slope of a hill, potential animal path, stony semi-desert
CT04	42.493439	75.835279	13.11.2024	6	Clay hills, along an animal path
CT05	42.508209	75.825568	13.11.2024	2	Riverine forest, on a tree, along an animal path, by a river
CT07	42.532043	75.815298	14.11.2024	2	Dry river bed, along animal path
CT08	42.639374	75.750305	07.01.2025	4	On a slope of a grassy field, along animal path
CT10	42.635864	75.746308	07.01.2025	4	On a slope of a rocky and grassy field, along animal path running along the ridge
CT11	42.702167	75.825941	07.01.2025	4	At the edge of a reed bed of a small wetland located in a grazed

Across all camera traps only three species of wild mammals were captured, including Golden Jackal *Canis aureus*, Red Fox *Vulpes vulpes* and Tolai Hare *Lupus tolai,* all listed by the IUCN as Least Concern and none listed in the Red Data Book of Kyrgyzstan (see Table 55, and Figure 128). All the species have been recorded on multiple occasions, indicating that they are relatively common, at least for specific locations. Both Tolai Hare and Red Fox were recorded repeatedly at 3 and 6 separate locations, respectively, indicating they are likely the most numerous mammal species within the surveyed area, which could be captured with camera traps.

Livestock was captured on 6 out of 9 camera traps for which data is available, including numerous registrations of flocks of sheep, cattle and horses.

People were captured on 4 of the camera traps, with 5 incidents of people passing in front of the camera on CT05, mostly represented by shepherds, however fishermen and hunters/poachers were also recorded.

Based on the results of mammal surveys, species diversity in the area surveyed is expected to be small. This is due to two main reasons. Firstly, mammal species diversity and abundance are naturally low in the habitats present, which mostly include sparsely vegetated stony and clay semi-desert habitats at medium altitudes and with low annual precipitation. Secondly, most of the area along the proposed OHTL ROW is frequently used by people. The flat areas are easily accessible, and people use the existing adjacent OHTL service roads to access higher altitude sections with rugged terrain. People and signs of their presence were encountered almost everywhere, both during transect and camera trap surveys. This indicates a high level of disturbance from people using the area for livestock grazing, hunting, fishing and tourism. Additionally, some hunters/poachers were recorded on one of the camera traps, suggesting that some mammals might be hunted.

Figure 128: Examples of images captured by camera traps deployed to survey mammals along the proposed OHTL route option 2

a) Tolai Hare *Lepus tolai*

b) Chukar

c) Hunter

d) Golden Jackal *Canis aureus*

Table 55: Observations of mammal species recorded by camera traps set up along the proposed OHTL route. Only observations from camera traps set up along the OHTL ROW are listed.

Camera ID	Species		IUCN status	Kyrgyz RDB status	Number of observations	Observation dates
	English name	Scientific name				
CT01	Tolai Hare	*Lepus tolai*	LC	Not assessed	3	01.10.2025, 03.02.2025, 06.02.2025
	Red Fox	*Vulpes vulpes*	LC	Not assessed	2	28.02.2025, 19.03.2025
CT02	Tolai Hare	*Lepus tolai*	LC	Not assessed	7	22.11.2024, 12.12.2024, 14.12.2024, 16.12.2024, 17.12.2024, 19.12.2024, 25.12.2024
CT03	Tolai Hare	*Lepus tolai*	LC	Not assessed	5	09.01.2025, 16.12.2024, 24.01.2025, 04.03.2025, 04.04.2025
	Red Fox	*Vulpes vulpes*	LC	Not assessed	2	15.11.2024, 19.03.2025
CT04	Red Fox	*Vulpes vulpes*	LC	Not assessed	2	29.01.2025, 04.04.2025
CT05	Golden Jackal	*Canis aureus*	LC	Not assessed	1	02.01.2025
	Red fox	*Vulpes vulpes*	LC	Not assessed	1	03.01.2025
CT07	Tolai Hare	*Lepus tolai*	LC	Not assessed	15	14.11.2024, 15.11.2024, 16.11.2024, 17.11.2024, 19.11.2024, 21.11.2024, 25.12.2024, 04.01.2025
	Golden Jackal	*Canis aureus*	LC	Not assessed	4	16.11.2024, 20.12.2024, 21.12.2024, 05.01.2025
CT08	-	-			-	No mammals recorded
CT10	Red Fox	*Vulpes vulpes*	LC	Not assessed	1	11.02.2025
CT11	Red Fox	*Vulpes vulpes*	LC	Not assessed	1	25.01.2025

Sensitive mammals

Two species of mammals were determined to be PBF for the Project, as a result of the CH/PBF assessment. No species triggered a CH determination.

Marbled Polecat

This member of the weasel family is widely distributed across the southern temperate latitudes of eastern Europe and central Asia, from Romania to Mongolia. While its global population size is not well known, the very large size of its global range precludes the possibility that this Project could cause the species to be globally uplisted to CR/EN, thus precluding a CH determination under IFC criterion 1b. Furthermore, although there is potentially suitable habitat for the species, it was not documented during the baseline surveys, indicating that it is not abundant within, and may be absent from, the Project area. The latest observations (last decades) of the species in the country are anecdotally limited to the western part of the Chu Valley and foothills of the Chatkal Mountain Range in the west of the country (Red Data Book of Kyrgyz Republic 2006). Nonetheless, it is considered a PBF based on its global VU status, and as a terrestrial species frequenting burrows and tunnels in which it hunts small mammal prey, it could be impacted through direct mortality, habitat loss, and/or displacement within the Project's soil/vegetation disturbance footprint, especially during construction.

Snow Leopard

The Snow Leopard is likely to be found at higher elevations within the mountain ranges on either side of the proposed OHTL. Although Snow Leopard crossings of the proposed OHTL are expected to be rare, there is anecdotal evidence that a snow leopard was seen crossing the EM11 road at night (Snow Leopard Foundation, unpublished data). Snow Leopards have been recorded historically on camera traps on both sides of the Boom Gorge, with the nearest confirmed record 25 km to the west of the OHTL route (Snow Leopard Foundation, unpublished data). Therefore, it is likely that some individuals cross the gorge, especially at night in winter when road traffic is weak and the water level in the Chu River is low. Camera traps CT08 and CT09, set up along the ridge to monitor potential winter movements of this cryptic species, did not capture any individuals. However, as these camera traps were set up in January, any potential movement of individuals earlier in autumn and winter would have been missed.

4.6.9 Bats

The effects of power line construction on bats remain poorly understood. Currently, there is no clear evidence of a significant impact of OHTLs on insectivorous bats, however, recent research has demonstrated that insectivorous bats may be attracted to OHTLs during rainfall, as the lines emit light and draw in insects, increasing foraging activity near the infrastructure (Froidevaux, 2023). Bats are known for their strong site fidelity, and during the construction phase, they may be affected due to increased noise and disturbance.

According to the South African Guidelines, a minimum buffer of 2 km should be maintained between large bat roosts and OHTLs, and at least 500 meters for smaller roosts (MacEwan et. al. 2020). Since no signs of major roosts within a 2 km buffer were identified during the desktop survey, field roost surveys were conducted only within this 500 m buffer.

As a result of the literature review, a list of 19 species potentially inhabiting the area was compiled in the *Table 56* below. Because bats are poorly studied in the region combined with their bird-like way of life (including active flight, seasonal migrations taken by certain species, change of winter and summer roosts, and swarming in separate locations) it should be taken into consideration that even species seemingly not so likely to inhabit the territory during surveys may be still found here under some special circumstances once in several years or decades.

Table 56: List and status of bats species potentially inhabiting the project area

ID	Species	IUCN Red list[120]	KRG RDB (2019)[121]	CMS122	Notes
1	Greater Horseshoe Bat *Rhinolophus ferrumequinum*	LC	-	II	Lives in caves, mines and other underground roosts, stone buildings (mosques and others).
2	Bukhara Horseshoe Bat *Rhinolophus bocharicus*	LC	VI (NT)	-	Lives in caves, mines and other underground roosts, stone buildings.
3	Lesser Horseshoe Bat *Rhinolophus hipposideros*	LC	VI (NT)	II	Lives in caves, mines and other underground roosts, abandoned buildings.
4	Blyth's Horseshoe Bat *Rhinolophus lepidus*	LC		-	Shelters – caves, adits, underground tunnels, grottoes, abandoned houses and stone tombs.
5	Lesser Mouse-eared Bat *Myotis blythii*	LC	-	II	Inhabits forest and arid landscapes. Lives in caves, grottoes and human constructions.
6	Geoffroy's Bat *Myotis emarginatus*	LC	-	II	Prefers open (especially arid) landscapes. Lives in caves, grottoes and attics of large buildings.
7	Bukhara Mouse-eared	DD	I (CR)		Inhabits mountainous landscapes, lives in caves, abandoned mines

120 The IUCN Red List Categories and Criteria are intended to be an easily and widely understood system for classifying species at high risk of global extinction. It divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW) and Extinct (EX). The signs designated the population trend are: S – stable, D- decreasing, U - unknown

121 KRZ RDB – Red Data Book of the Republic of Kyrgyzstan.

122 CMS - Convention on the Conservation of Migratory Species of Wild Animals, Appendix I, II (effective 17 May 2024).

ID	Species	IUCN Red list[120]	KRG RDB (2019)[121]	CMS122	Notes
	Bat *Myotis bucharensis*				
8	David's myotis *Myotis davidii*	LC	-	II	Inhabits various, mainly arid, landscapes from the south of the forest zone to semi-deserts, usually associated with open habitats, including anthropogenic ones. Shelters are crevice-like shelters in buildings, rock crevices and caves.
9	Asian Barbastelle *Barbastella leucomelas*	LC	VI (NT)	II	Poorly studied species found mainly in mountains and foothills. Shelters are adits, caves, ruins, rock cracks.
10	Long-eared Bat *Plecotus strelkovi*	LC	-	-	Inhabits foothills and midlands, arid landscapes. Shelters are caves and adits, and possibly also human-made structures.
11	Noctule Bat *Nyctalus noctula*	LC	-	II	Inhabits landscapes from deserts to tropical rain forests and temperate mixed forests, in the mountains up to 2500 m above sea level. The main shelters are tree hollows and human buildings. They make seasonal migrations up to 1600 km.
12	Common pipistrelle bat *Pipistrellus pipistrellus*	LC	-	II	It inhabits various landscapes, but prefers anthropogenic lands; it often lives in human settlements, including cities. It settles in human buildings, less often in tree hollows and other crevice-like shelters.
13	Northern bat *Eptesicus nilssonii*	LC	-	II	Inhabits forested areas. Shelters are wooden buildings, hollows, rock cracks.
14	Serotine Bat *Eptesicus serotinus*	LC	-	II	Lives in various, mostly anthropogenic, landscapes. It usually settles in human buildings, less often in rock cracks.
15	Botta's serotine *Eptesicus ognevi*	LC	-	II	Shelters are rock crevices, caves, ruins and buildings.
16	Gobi big brown bat *Eptesicus gobiensis*	LC	-		Inhabits mainly open arid (desert and steppe) landscapes. Shelters are rock cracks and human structures.
17	Particoloured Bat *Vespertilio murinus*	LC	-	II	Lives in a wide variety of landscapes, including anthropogenic ones, in the mountains up to 3000 m above sea level. Shelters are human buildings and tree hollows.
18	Hemprich's Long-eared Bat *Otonycteris leucophaea*	DD	VII (LC)		It is confined to arid landscapes. Shelters are rock cracks and human structures.

ID	Species	IUCN Red list[120]	KRG RDB (2019)[121]	CMS122	Notes
19	European Free-tailed Bat *Tadarida teniotis*	LC	VII (LC)	II	It settles in small colonies (up to several dozen individuals) in vertical rock cracks, under overhanging rock ledges.

Fieldwork was conducted between 16 and 17 April 2025, and included a survey of potential roost locations identified during the desktop stage (Figure 129). When a potential roost was found, it was thoroughly examined, both for the presence of bats (visually or by voice), and for signs of their presence – droppings (excrement). Using flashlights, all crevices in vertical walls in buildings were examined. As for building ceilings, they are often made of numerous wooden planks or branches covered with reeds, which gives almost unlimited possibilities for bats to hide with no evidence of their presence, as soon as their droppings mix with sheep and other farm animals' excrements on the ground. Each potential roost was surveyed was mapped and photographed; a brief description was made, including notes on the suitability of each roost for bats.

The field survey confirmed that the OHTL ROW offers suitable conditions for bat roosting, although no signs of current or recent use of the area by bats were observed at the sites that were surveyed. However, due to challenging terrain and the presence of numerous crevices located at inaccessible heights, it was not possible to examine the most promising potential roosting sites.

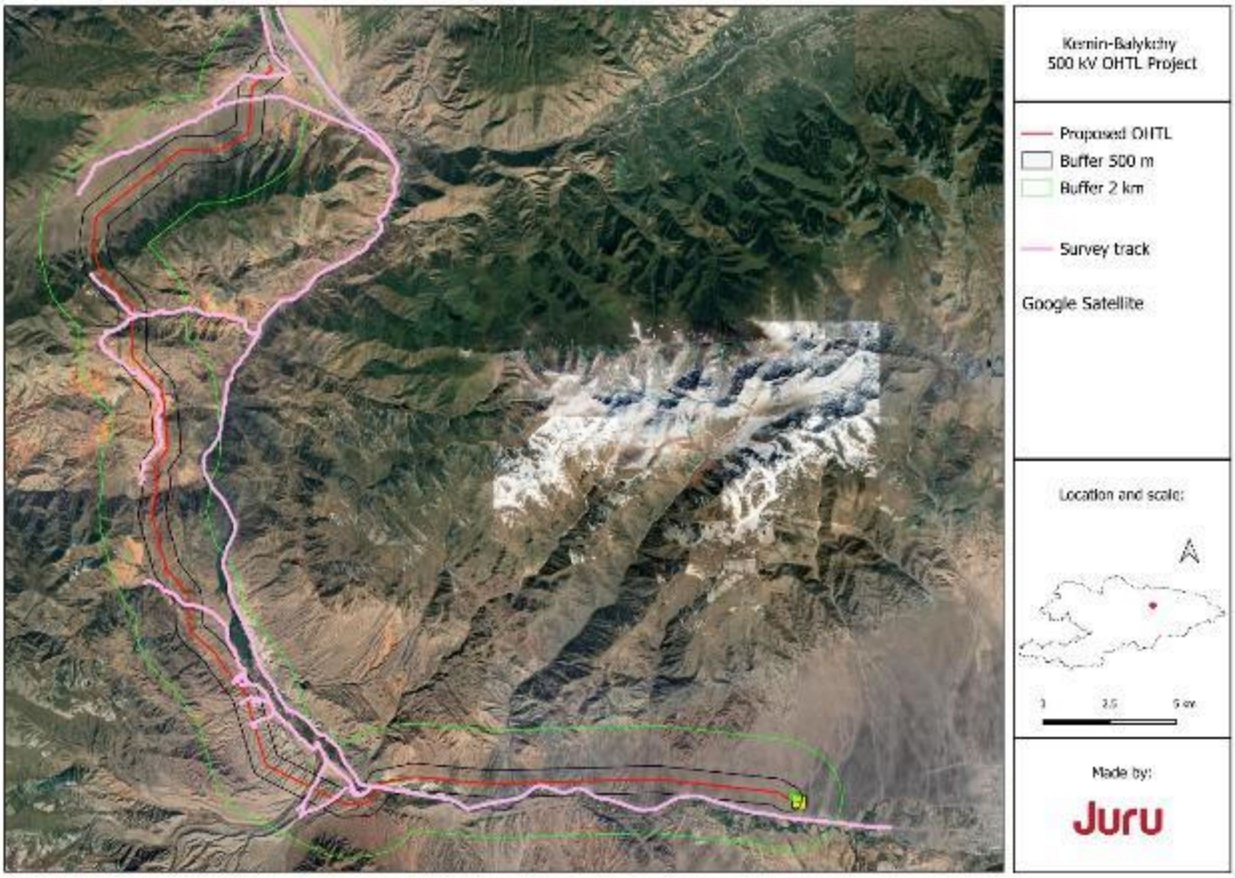
Assessing the likelihood of these roosts being used by bats is difficult, as bats are not limited to areas accessible to humans and may occupy hard-to-reach or high-altitude locations. The area contains a large number of potential roosting sites - rock formations and canyons with abundant cracks and cavities suitable for bats.

Additionally, considering the recreational use of the area, it is reasonable to assume that, other factors being equal, bats would prefer locations undisturbed by human activity. As these sites are usually less accessible/ inaccessible, this limits the ability to thoroughly inspect many roosting sites.

The survey was conducted in mid-April in a mountainous region characterized by a colder climate and sharp temperature fluctuations. During the survey, temperatures were unusually low (between +5°C and +10°C), which could potentially delay bat migration into the area. Furthermore, any guano potentially left from the previous year - a possible indirect sign of bat presence - may have been removed by insects or dispersed by wind, particularly at smaller roosts.

All these factors present significant challenges to identifying bat roosts. Therefore, the absence of direct signs of bats (such as individuals or droppings) should not be interpreted as evidence of their absence. Nonetheless, the absence of sensitive species from the area, combined with the lack of evidence for significant or important concentrations of bats resulted in no species of bats being classified as PBF for the Project..

Figure 129: Survey track across the project area within 500 m and 2 km buffer zones



4.6.10 Fish surveys

Ichthyological surveys were carried out between 27 and 29 March, 2025 at seven survey locations along the middle reaches of the Chu River (Table 57),

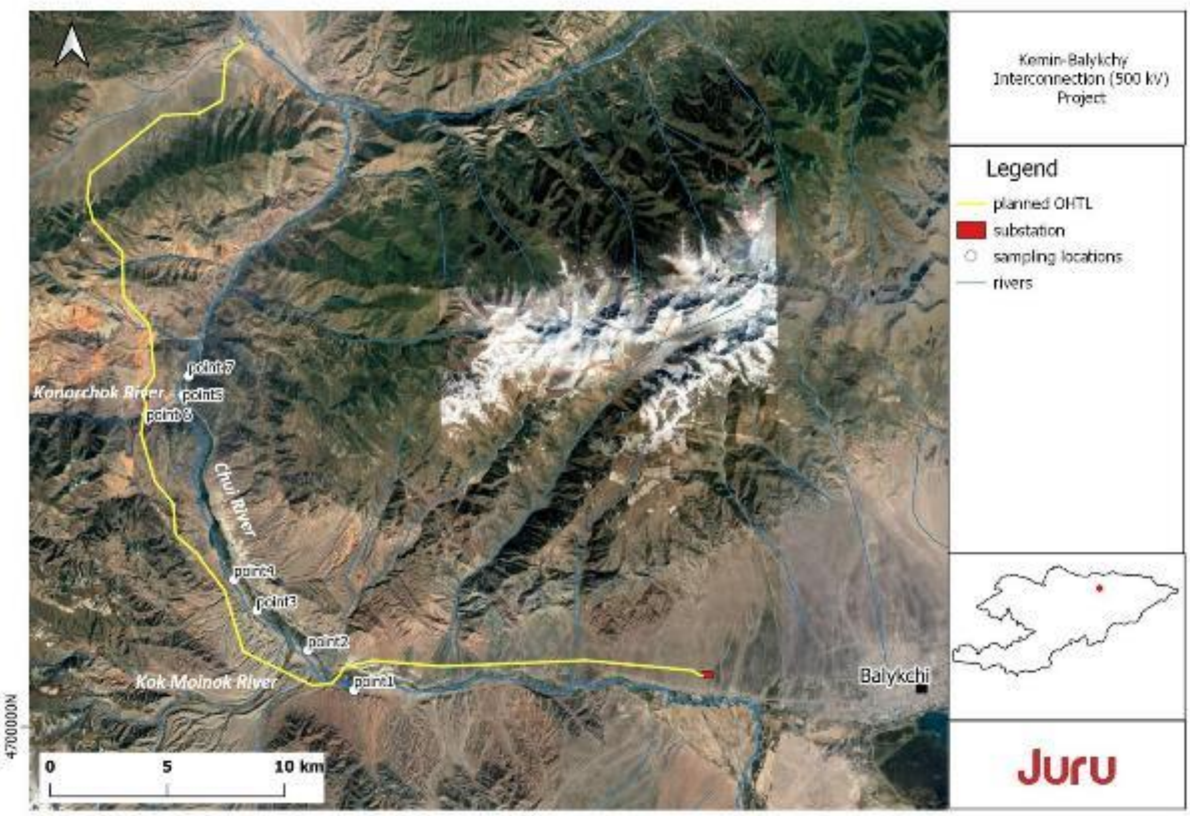
Figure *130*). The locations were distributed to cover sections of the Chu River and its Konorchok and Kok-Moynok tributaries upstream and downstream from the three points where the OHTL will be crossing these waterbodies.

To determine fish population density in the rivers, fish were caught using straining fishing gear (a standard seine net 2-10 m long) with a mesh size of 6 mm. To calculate biomass, individual fish weights were estimated using linear weight-length relationship equations based on their measurements. Using identification guides and technical literature, the species identification of fish was determined, the abundance (by species) was counted, and the total length and length without the caudal fin, as well as body weight, were measured. The sex and maturity stage of fish subjected to biological analysis were determined in the field. The age of the fish was determined by studying scales according to guidelines.

Table 57: Location of the Monitoring Points

Monitoring Point	Coordinates
Point 1	42°27'46.8"N 75°53'27.3"E
Point 2	42°28'42.5"N 75°52'03.2"E
Point 3	42°29'37.9"N 75°50'27.4"E
Point 4	42°30'21.0"N 75°49'44.7"E
Point 5	42°34'37.6"N 75°48'11.4"E
Point 6	42°34'09.1"N 75°47'02.6"E
Point 7	42°35'01.0"N 75°48'21.5"E

Figure 130: Locations for ichthyological and hydrobiological surveys of rivers along the proposed OHTL route



To determine fish abundance, a simple count of the number of fish caught per average riverbank length of 50 meters was used. After species identification and measurements, all fish were safely released back into the river.

A total of 4 species of fish were identified at seven sampled locations along the proposed Kemin-Balykchy OHTL ROW (Table 58). Individuals of at least one fish species were caught at each location, with the highest number of individuals caught at location P7 and the lowest at location P6. Only two fish species with elevated conservation status were captured, one with VU status on the IUCN global red list of threatened species, and one that is listed in the Red Data Book of Kyrgyzstan.

Table 58: Number of individuals of fish species caught at each sampling location during fish surveys along the proposed Kemin-Balykchi OHTL route conducted in March 2025.

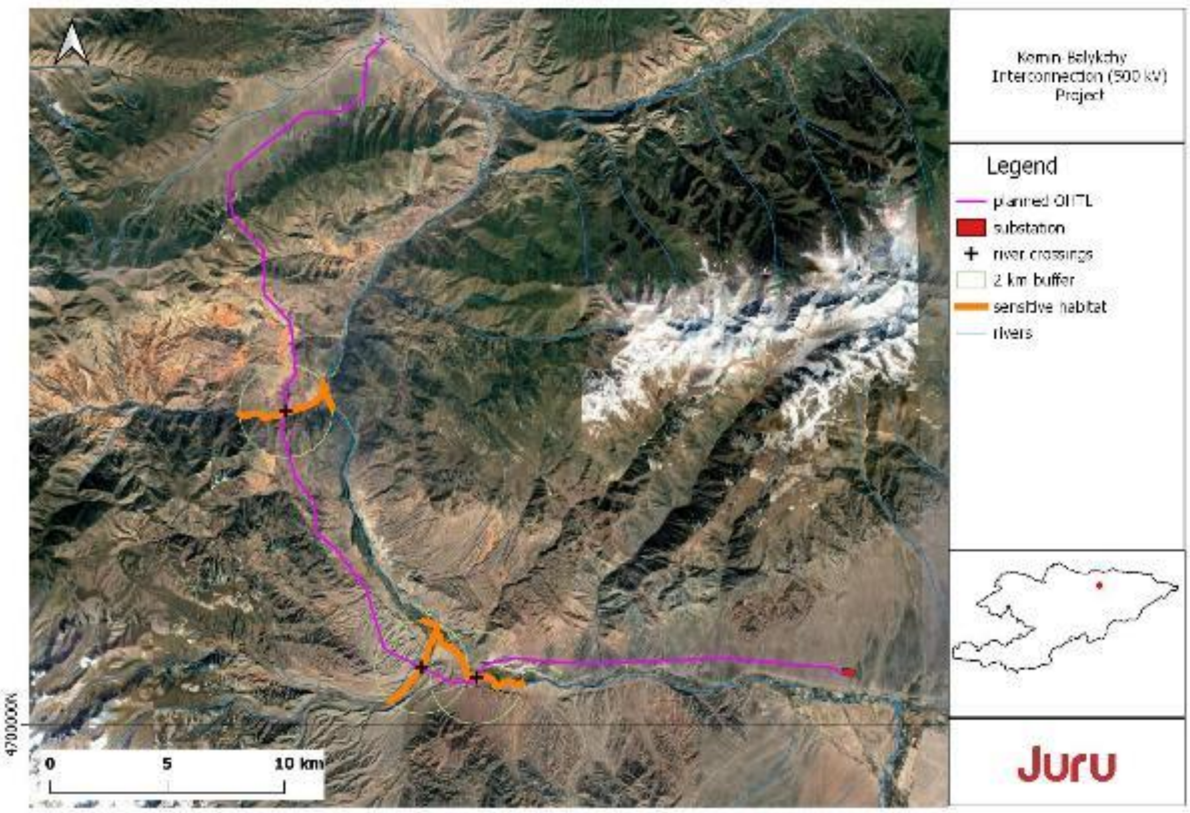
Scientific Name	IUCN/KG RDB status	P1	P2	P3	P4	P5	P6	P7
Schizothorax pseudoaksaiensis	VU/-	3	1	3	8	-	-	12
Diptychus dybowskii	LC/-	47	12	27	25	12	-	49
Triplophysa stoliczkai	LC/-	16	8	16	13	19	7	78
Rhynchocypris dementjevi	LC/-	-	-	9	16	-	-	-

Sensitive fish species

Five species of fish were identified as PBF for the Project. Two of them were documented during the Project's baseline studies. None of them trigger a Critical Habitat determination. While most of the OHTL is located in purely upland habitats, and the line comes no closer than 6.8 km from the shore of Lake Issyk-Kul, the OHTL will cross fish-bearing rivers in three places Figure 131. The river crossings will be entirely aerial, and the terrestrial footprint of the Project's permanent infrastructure (towers) will not overlap or infringe upon the rivers at any of these crossings. Nonetheless, Project construction activities could potentially result in minor sediment inputs or other minor temporary impacts, hence the Project's EAAA for fish species that potentially occur in these rivers[123] was delineated as encompassing all portions of the Chu River and major tributaries (Konorchok River, Kok-Moynok River) within 2 km of one of the Project's river crossing points (Figure 131).

123 Fish species restricted entirely to Lake Issyk-Kul, including for spawning activities, were excluded from consideration for the CHA

Figure 131: Ecologically Appropriate Area of Analysis (EAAA, orange portions of rivers) #3 for the Kemin-Balykchy OHTL Project (purple line). This EAAA covers a total length of 15.047 kilometres of the Chui, Konorchok, and Kok-Moynok Rivers and was used for the Critical Habitat/PBF assessment of fish species.



Rhynchocypris dementjevi **(IUCN LC, Kyrgyz RDB unlisted, Restricted Range)**

This is a locally common and abundant fish species, with no elevated status on either national or international red lists. However, it has an extremely restricted geographic range, limited to a 200 km stretch of the Chu River in Kyrgyzstan and Kazakhstan. There were 25 total detections of this species during the Project's baseline surveys. In river-dwelling species for which population size is not well-characterised, the length of a river is frequently used as a proxy for population, effectively assuming that populations are evenly distributed across the stretches of river in which they occur. The Project's EAAA encompasses 15.047 km of river, which comprises 7.5% of the 200 km total range of this species. CH criterion 3 requires that the EAAA contain at least 10% of the species' global population; hence, CH is not triggered for this species.

Schizothorax pseudoaksaiensis **(IUCN VU, Kyrgyz RDB unlisted, Restricted Range)**

This fish species is restricted to six watersheds draining into either Lake Balkash or Lake Issyk-Kul, encompassing a total Area of Occupancy (AOO) of 300 km^2. The IUCN does not present an Extent of Occurrence (EOO) for this species, but indicates that it was formerly more widespread, and has been extirpated from some parts of its former range due to overfishing and the introduction of exotic species. We note that there is a subspecies of *S. pseudoaksaiensis* (ssp. *Issykkuli*) that is classified as EN on the national red list, called the "Issyk Kul Marinka." However, this subspecies is entirely restricted to Lake Issyk-Kul, even spawning within the Lake, hence the Project does not have the potential to impact it. The form of *S. pseudoaksaiensis* occurring within the Chu River and major tributaries (called the "Illi Marinka") and documented with 27 observations during the Project's baseline study is not nationally redlisted, hence the only potential CH triggers would be 2b, requiring that the Project may result in the species' global uplisting to CR/EN or 3, requiring that the Project's EAAA encompass at least 10% of the global population. With only 15 km of the Chu River and tributaries contained within the Project's EAAA, and an AOO that encompasses 300 km^2 spread across 6 separate river systems, the fraction of this species' population contained within the Project's EAAA is likely far below 1%, hence CH is not triggered.

Figure 132: Ili Marinka (Schizothorax pseudoaksaiensis) from the middle reaches of the Chu River

Phoxinus issykkulensis **(IUCN LC, Kyrgyz unlisted, Restricted Range)**

This restricted-range fish species can occur within rivers, hence could potentially occur within the Project's EAAA. However, it was not detected during the Project's baseline study, and the species' EOO is much larger than that of the other restricted range fish species evaluated in this CHA, at 24,073 km^2, hence, CH (criterion 3) is not triggered for this species.

Triplophysa labiata **(IUCN VU, Kyrgyz unlisted)**

This globally VU fish species can occur within rivers, hence could potentially occur within the Project's EAAA. However, it was not detected during the Project's baseline study, hence, the Project is not considered likely to cause the species' uplisting to globally CR/EN. Therefore, CH is not triggered (criterion 2b).

Leuciscus schmidti **(IUCN VU, Kyrgyz unlisted, Restricted Range)**

This restricted-range fish species occurs only in Lake Issyk-Kul during most of its life, but it does come into the lower reaches of major rivers surrounding the Lake for spawning, hence it could potentially occur within the Project's EAAA. However, it was not detected during the Project's baseline study, which took place during this species' spawning season[124], and the Project's EAAA (15.047 km) is very small relative to this species' EOO (7,306 km^2) hence neither of the potentially applicable CH criteria (2b, 3) are triggered for this species.

124 Spawning end-march – mid-May, per https://www.tagmyfish.com/waters/endorheic-lake/isik-kul#:~:text=Strictly%20endemic%20fish%20Schmidt%20Dace,is%20present%20throughout%20the%20shallows.

5 Stakeholder Engagement

5.1 Stakeholder engagement approach

Stakeholder engagement is the process of identifying, mapping and prioritising stakeholders that might be impacted due to Project activities, have a particular interest in the Project or have a decision-making status about the Project.

A Stakeholder Engagement Plan (SEP) has been prepared on behalf of NEGK to maintain and guide stakeholder engagement over the lifetime of the Project. The SEP currently focuses on engagement during the ESIA phase but will remain a live document and subject to further updates and guidance during the construction and operation phases.

Stakeholder engagement in the SEP has been planned according to Kyrgyz legislation for Category I projects and EBRD requirements for Category A projects. This section provides a summary of the content of the SEP.

5.2 SEP objectives

The main objectives of the SEP are as follows:

- Identifying and mapping potential Project stakeholders;
- Preparing a stakeholder matrix that includes all stakeholders that may be impacted by or interested in the Project. It also identifies key organisations and communities who need to be consulted to provide the Project with permissions related to the Project.
- Establishing relevant communication approaches to each stakeholder group to deliver Project information and conduct consultations.
- Recording feedback, concerns and views of stakeholders regarding the Project.
- Developing and maintaining relevant grievance mechanisms (GMs) to accommodate all stakeholders;
- Establishing proper/suitable means of communication, especially with vulnerable groups and women, to prevent any risks relating to Gender-Based Violence (GBV), including Sexual Exploitation and Abuse (SEA).

All stakeholder engagement will be carried out in a culturally appropriate manner, and in languages that stakeholders understand, these will include: Kyrgyz and Russian as relevant. Planning for engagement activities will consider cultural and economic elements to ensure the greatest number of stakeholders can attend (for example when women can attend, or when herders are at their houses and not out grazing their animals).

5.3 Stakeholder identification

Table 59 provides the stakeholder engagement matrix consisting of individuals, communities, organisations, and Government agencies considered stakeholders of the OHTL. By applying a systematic approach, the current stakeholder matrix has been classified into two main categories based on the type of interest.

- (A) Affected/impacted stakeholders (these can be directly or indirectly affected by the Project.
- (I/D) Interest-based stakeholders (those stakeholders that have a certain interest in the Project, i.e., the Project's beneficiaries, NGOs, civil society) or Decision-making stakeholders (groups/individuals/organisations that decide the Project, i.e., Project lenders, local regulators, etc

Table 59: Stakeholder engagement matrix

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
Directly affected communities (local villages and land users)	Balykchy city Cholok ayil Kok-Moynok 1 ayil Kok-Moynok 2 ayil DEU-10 community Standalone households along the OHTL route (and the EM11 highway)	A/I: The closest communities to the OHTL route and substations, which might be affected by construction works, and potential adverse impacts from construction activity, such as increased dust level, noise and influx of people. Potential employment benefits from the Project.	Public meetings/WhatsApp channel/phone calls / written correspondence/ village walk-throughs / distribution of leaflets/focus group discussions/ social media / media releases.
Indirectly affected communities	Boroldoy, Dorozhniy, Jil-Aryk, Kemin, Kichi-Kemin, Kyz-Kiya, Kyzyl-Oktabr, and Orlovka communities	A/I: Communities within 15km of the OHTL route and the substations, which might have impacts to tourism, transportation, influx of people and potential employment and procurement benefits from the Project.	Public meetings/ public hearings/ social media / media releases.
Directly affected	Individual landowners/land users	A/I/D: Possible loss of assets or livelihood	Face-to-face meetings /

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
landowners and land users/businesses.	Herders Gardeners near Balykchy	due to land acquisition/provision of servitude rights.	public meetings / WhatsApp channel / phone calls / written correspondence / focus group discussions/ socioeconomic (LARF) survey/ social media / media releases.
	Canteens/shops along the EM11 highway.	A/I/D: Food supplies and tourism could be impacted by traffic during equipment transportation and construction works. Workers may frequent canteens during construction works.	Face-to-face meetings / public meetings/WhatsApp channel / public hearings/ phone calls social media / media releases.
Owners of directly / indirectly affected infrastructure	Owners of the cement manufacturing facility NEGK (owner of existing transmission lines) Owners of irrigation channels near Kemin SS JS "Kyrgyz Railways" Seismicity measure station 'Boom'	A/I/D: The infrastructure may require the Project to follow specific standards during construction to avoid any negative consequences/ emergencies resulting from construction. Possible temporary disruptions due to construction activities. The infrastructure may also have temporary or permanent workers impacted by construction.	Face-to-face meetings/ phone calls / WhatsApp channel) / written correspondence / social media / media releases.

Stakeholder Group	Stakeholder Entities	Relevance to Project: “impact-based” (A), interest-based or decision-maker (I/D)	Method of communication
		The infrastructure may be required to align their operating and Project standards.	
	NABU Wildlife rehabilitation centre	No land acquisition or servitude rights required; however, the OHTL passes close to the centre and the centre may face temporary disruptions due to construction activities.	
	Industrial facilities (factories, warehouses, etc.)	I/D: No land acquisition or servitude rights required; facilities are not located within the project footprint. No direct impact expected.	
	Fish farmer	I/D: Located approximately 1 km from the project area; no direct impact expected on assets or livelihood.	
Community leaders	Chairman of ‘Cholok’ village	A/I/D: Responsible for affected communities, and they can influence the information community members receive about the Project.	Face-to-face meetings / public meetings / WhatsApp channel / phone calls / written correspondence.
	Town council of Balykchy city		
	Chairman of ‘Kok-Moynok-1’ Village		
	Chairman of ‘Kok-Moynok-2’ Village		

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
Vulnerable groups and women	Women	A: Women may not have equal access to Project information, may be disproportionally impacted by project impacts and may not have equal access to Project (including livelihood restoration) benefits where applicable.	Face-to-face meetings/ public meetings / WhatsApp channel / village walk-throughs / phone calls / written correspondence / socioeconomic survey.
	Youth/children	A: Youth and children may be disproportionally impacted by the Project and may not have the same access to information as others.	
	Elderly and disabled	A: If impacted by the Project, these people may be unable to attend all public meetings and be part of Project planning.	Face-to-face meetings/ phone calls/WhatsApp channel / written correspondence / socioeconomic survey.
	Illiterate or semi-literate	A: These people may not be able to understand all the information provided about the Project and will need assistance.	Face-to-face meetings/ public meetings/village walk-throughs / phone calls / socioeconomic survey.
Employees and labour	Herders' employees/community members that herd animals for others	A: May be impacted by the construction works, dust or traffic for example. They may temporarily lose access to herding grounds.	Face-to-face meetings / public meetings / social media (WhatsApp channel) /

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
	Directly affected infrastructure workers (such as manufacturing workers)	A: May be impacted by the construction works, dust or traffic for example.	phone calls/ social media / media releases.
National Government bodies	JSC "Gazprom Kyrgyz Republic"	I/D: Consulted to obtain information on construction measures to avoid disturbance to gas pipelines.	Face-to-face meetings / public meetings/phone calls / written correspondence.
	State Enterprise "NC "Kyrgyz Temir Zholu"	I/D: Consulted to identify planned and existing telecommunication facilities (e.g., transmission cables) within the project-affected areas).	
	Kyrgyztelecom OJSC	I/D: Consulted to get information on construction measures to avoid disturbance to communication lines.	
	"NEGK" OJSC	I/D: Responsible for the development of the Project.	Face-to-face meetings / phone calls / written correspondence.
	PJSC National Electric Grid of Kyrgyzstan (Regional departments: JSC Severelektro and OJSC Vostokelectro)	I/D: Review and approval of project design, land acquisition, operational off-take, and operation and maintenance (O&M) of planned interconnection facilities post power purchase agreement (PPA) term completion	Face-to-face meetings / phone calls / written correspondence

Stakeholder Group	Stakeholder Entities	Relevance to Project: “impact-based” (A), interest-based or decision-maker (I/D)	Method of communication
	Ministry of Energy	I/D: Review and approval of project design, land acquisition, operational off-take and O&M of planned power generation facilities post PPA term completion.	Face-to-face meetings / phone calls / written correspondence
	State Registration Service of the Cabinet of Ministers	I/D: Custodianship of land reserved for governmental, communal and private pastural use.	Face-to-face meetings / phone calls / written correspondence
	Ministry of Water Resources, Agriculture and Processing Industry of the Kyrgyz Republic	I/D: Provision of information on planned and existing irrigational water supply facilities within the project-affected areas	Face-to-face meetings / phone calls / written correspondence.
	Department of Drinking Water Supply Development under the State Agency for Architecture, Construction and Housing and Communal Services	I/D: Provision of information on planned and existing irrigational water supply facilities within the project-affected areas,	Face-to-face meetings / phone calls / written correspondence.
	Ministry of Labour, Social Security, and Migration	I/D: Statutory consultees.	Face-to-face meetings / phone calls / written correspondence.
	Institute of Biology of the National Academy of Sciences	I/D: Provision of information on biodiversity and technical support on ad-hoc baseline surveys for specific faunal species and habitats.	Face-to-face meetings / phone calls / written correspondence.

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
	Ministry of Health (Department of Disease Prevention and State Sanitary-Epidemiological Supervision)	I/D: Statutory consultees. Also, responsible for the protection of employees and public safety. Responsible for the establishment of health and protection zones around the OHTL.	Face-to-face meetings / phone calls / written correspondence.
	Ministry of Transport and Communications	I/D: Provision of information on the transport infrastructure within the project-affected areas and execution of laws and regulations about the operation and maintenance of related infrastructure	Face-to-face meetings / phone calls / written correspondence.
	Ministry of Emergency Situations	I/D: Emergency response to natural disasters and other contingencies and mobilisation of humanitarian aid.	Face-to-face meetings / phone calls / written correspondence.
	Forest Service under the Ministry of Emergency Situations	A/I/D: Landowners of some of the Project land. Provision of information on biodiversity and ecologically important water resources General monitoring of E&S compliance during the Project's construction and operational phases.	Face-to-face meetings / phone calls / written correspondence.

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
	Ministry of Natural Resources, Ecology, and Technical Supervision	I/D: Statutory consultees. Control of national environmental policy and protection standards. Responsible for EIA approval.	Face-to-face meetings / phone calls / written correspondence.
	Kyrgyz Geological Service	I/D: Approves permits for specific activities carried out on site. Provision of information on planned and existing mineral exploration surveys	Face-to-face meetings / phone calls / written correspondence.
	The Institute of History, Archaeology and Ethnology, is named after B. Dzhamgerchinov of the National Academy of Sciences of Kyrgyz Republic.	I/D: To confirm the presence of objects or locations of archaeological significance.	Face-to-face meetings / phone calls / written correspondence.
	Ministry of Culture, Information, Sports, and Youth Policy	I/D: To confirm the presence of objects or locations of cultural significance.	Face-to-face meetings / phone calls / written correspondence.
Provincial / Municipal / Local Government Departments – all levels	Chui regional akimiyat	A/I/D: Will make decisions on land allocation and Project realisation.	Face-to-face meetings / phone calls / written correspondence.
	Kemin district akimiyat	A/I/D: Will make decisions on land allocation and Project realisation.	
	Kyzyl-Oktyabr ayil okmotu	A/I/D: Will make decisions on land allocation and Project realisation.	

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
	Issyk-Kul regional akimiyat	A/I/D: Will make decisions on land allocation and Project realisation.	
	Mayor's office of Balykchy city	A/I/D: Will make decisions on land allocation and Project realisation.	
	Mayor's office of Orlovka city	A/I/D: Will make decisions on land allocation and Project realisation.	
	The Pasturelands Management Departments	I/D: They are not directly affected by the project's physical impacts, but they play an important role in land use planning, oversight of pasture access, and regulatory decisions.	Face-to-face meetings/ phone calls / written correspondence
	Kemin Branch of the State Agency for Land Resources, Cadastre, Geodesy and Cartography	I/D Custodianship of land reserved for governmental, communal and private pasture use.	Face-to-face meetings / phone calls / written correspondence.
	Balykchy Branch of the State Agency for Land Resources, Cadastre, Geodesy and Cartography	I/D Custodianship of land reserved for governmental, communal and private pasture use.	Face to face meetings / phone calls / written correspondence.
	Department of Communications, Construction, and Transport of the Mayor's Office of Balykchy city	I/D Custodianship of land reserved for governmental, communal and private pasture use.	Face to face meetings / phone calls / written correspondence.

Stakeholder Group	Stakeholder Entities	Relevance to Project: "impact-based" (A), interest-based or decision-maker (I/D)	Method of communication
Civil society, NGOs, research bodies	NGOs working in the regions, such as: • Kyrgyz Society for the Protection of Wildlife • Baktyluu Ene and Nurmeeyasa (women's shelters) • Red Crescent Society • Balykchy city Healthcare department • Representative of IUCN Tulip Specialist Group Snow Leopard Foundation • Representative of Snow Leopard Foundation in Kyrgyzstan	I/D: Depending on the core purpose of the specified NGO.	Face-to-face meetings / phone calls / written correspondence / social media.
Media	Regional and local mass media (newspapers, radio, television as relevant) • Balykchy Press (local mass media) • Issyk-Kul TV (regional mass media)	I/D: Will need to be involved in disseminating information about the Project.	Written correspondence/phone calls.
Users and custodians of cultural heritage sites	• Ministry of Culture, Information, Sports, and Youth Policy of the Kyrgyz Republic • Institute of Archaeology	A/I/D: Will make decisions on cultulra heritage impact and project mitigation requirements.	Written correspondence/phone calls.

5.4 Summary of stakeholder engagement until the ESIA phase

5.4.1 Scoping stakeholder engagement

During the scoping site visit 12-14 November, 2024, undertaken to inform the preparation of the Scoping report, consultations took place with the following key stakeholders:

- National Electric Grid of Kyrgyzstan (NEGK);
- "Evidence CA" LLC (a locally engaged subcontractor);
- Balykchy city municipality;
- Kok-Moynok 2 ayil;
- Gardener in the ayil Kok-Moynok 2;
- Kemin district municipality;
- Kyzl-Oktyabr ayil okmotu;
- Kok-Moynok 1 ayil;
- Workers at businesses along the OHTL route.
- Herder and his worker

Official letters were sent to the Kemin and Balykchy branches of the State Agency for Land Resources, Cadastre, Geodesy and Cartography under the Cabinet of Ministers of the Kyrgyz Republic and to the Balykchy municipality. During the meetings, leaflets were distributed to participants that provided the key information about the Project as well as contact details of the ESIA Consultant.

5.4.2 Stakeholder consultation at ESIA stage

During the site visit from 3 to 11 April, 2025, the following activities were undertaken to inform the preparation of the ESIA and LARF:

- Notifications to key stakeholders (no response required);
- Business correspondence (e.g., formal letters sent to local government authorities and relevant ministries to request information, coordinate meetings, and facilitate the organization of consultations for the ESIA and LARF processes);
- Socioeconomic surveys of communities along the OHTL RoW;
- Focus group discussions (FGDs – for the ESIA and LARF), including four FGDs conducted in three locations: one in Kok-Moynok 1 Ayil, one in Kok-Moynok 2 Ayil, and two in Cholok Ayil;
- Key informant interviews (KIIs – for the ESIA and LARF) with accommodation providers, tourism representatives, business owners.

As with the scoping phase, during the meetings, participants were provided with information about the Project in the form of an ESIA brochure as well as contact details of the ESIA Consultant.

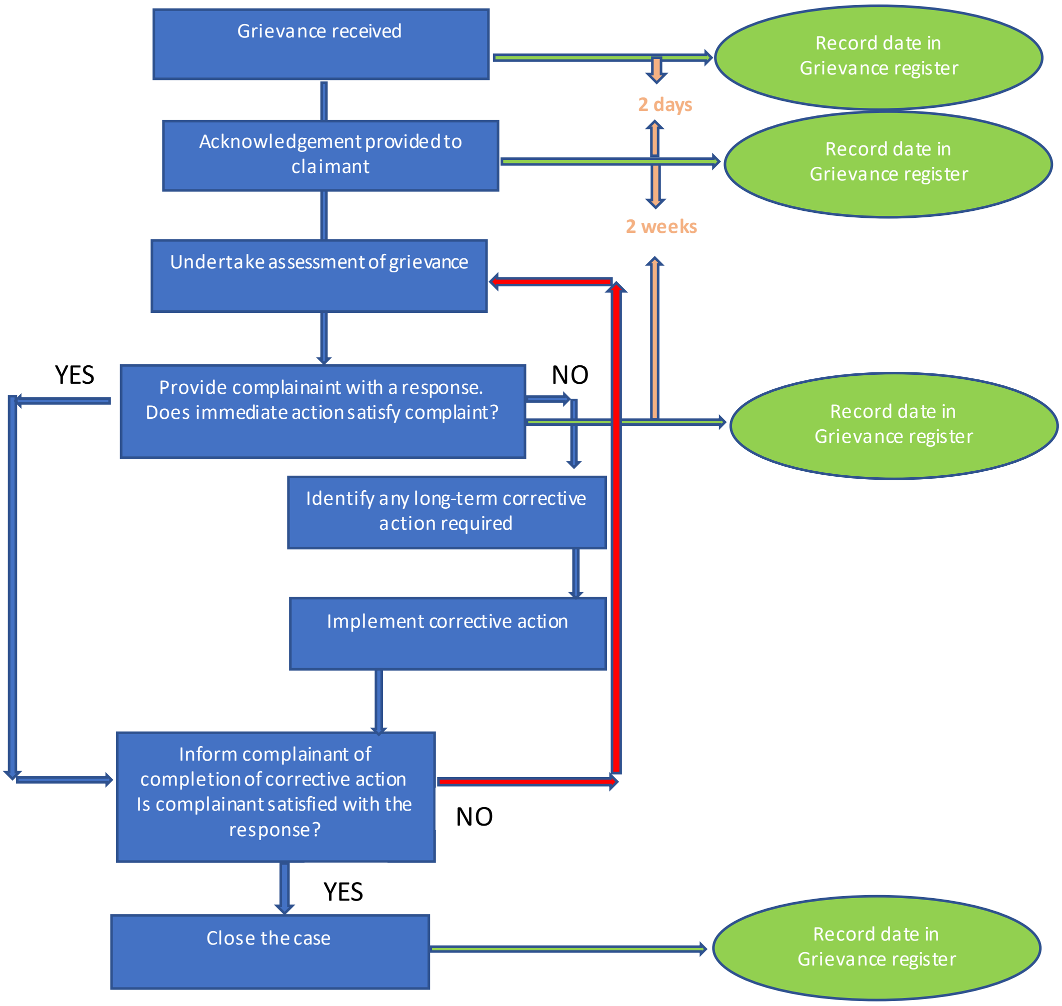
5.4.3 Stakeholder disclosure (draft ESIA)

Public meetings for the disclosure of the draft ESIA were held from June 16, 2025 to June 17, 2025. These meetings were also arranged and announced through the official letters sent to the district authorities. A power point presentation was be prepared and disclosed during the meetings, which covered the key impacts identified during the study, provided responses to questions that were asked during the April 2025 meetings, and provided the mitigation and planning that has been identified during the preparation of the ESIA. The meetings were an opportunity for stakeholders to ask questions on the Project and the findings of the ESIA. The grievance mechanism was also disclosed to meeting attendees and on the handouts. A full summary of that were undertaken in support of the draft ESIA disclosure meetings is provided in K-B Public Consultation and Disclosure report (appended to the SEP).

5.5 Grievance mechanism

Project grievances can be raised during meetings, site visits, phone calls, or in written form (text messages, email, mobile apps). Upon receipt, the grievance will be logged. The process ensures confidentiality, including personal information. Complainants may also submit grievances anonymously. After registration, applicants receive a written notification within two working days detailing the investigation timeline. A response will be provided within two working weeks of submission. Resolution approaches depend on the nature and frequency of grievances.

Figure 133: Grievance mechanism flow chart



A Community Liaison Officer (CLO) will be identified by the Main Contractor during construction and by NEGK during the operations phase. The current point of contact for NEGK is provided in Chapter 1. Included in the SEP contains a sample grievance form. The grievance form will be made available in English, Russian and Kyrgyz. All grievances will be handled in the preferred language of the complainant and in a culturally appropriate manner.

6 Impact Assessment Methodology

6.1 ESIA terms of reference

The ESIA scoping[125] process identified the issues and impacts to be addressed in the ESIA and as summarised in Table 60 below. The detailed terms of reference (TOR) for this ESIA study is provided in Volume III – Technical annexes.

Table 60: Topics scoped into the ESIA

Environment and Health	**Social**	**Labor**
• Air quality (C/D); • Noise and vibration (C/D) • Waste (including hazardous waste) (C/O/D) • Climate resilience (C/O/D) • Soil and (C/D) • Water resources (C/D); • Hydrogeology (C/D) • Biodiversity (habitat loss, impact on critical habitat and PBF) • Landscape and visual impact (O) • Cumulative impacts (C, O) • EMF/EMC (O)	• Community health and safety (C/O/D) • Traffic and Transportation (C/D) • Security (C/D) • Emergency preparedness and response (C/O/D) • Livelihood and land use (C) • Cultural heritage (C/D)	• Occupational Health and Safety (C/O/D) • Labor rights (C/O/D) • Employment (positive) (C/D) • Gender-based Violence (GBV) (C/D) • Human rights (C/O/D) • Procurement/supply chain (C/D)
Scoped out: Air quality (O) Noise (O) Soils (O) Landscape and visual impact (C/D) Radio and TV interference (C, O, D) Traffic and transportation (O) Greenhouse gases (O) Cultural heritage (O) Procurement/supply chain (O) Indigenous Peoples Transboundary impacts Security (O)		

125 Juru, Kemin-Balykchy OHTL Scoping report, January 2025.

Note: C = Construction, O = Operations, D = Decommissioning

The scope of the impact assessment considers:

- The Project and related and associated facilities (as described in chapter 2).
- Risks and impacts that may arise for each activity in the Project cycle, including site establishment, installation and testing, and site closure / decommissioning.
- Role and capacity of the relevant parties including government, contractors and suppliers.
- Potential third-party impacts including supply chain considerations.

This ESIA has identified potential beneficial and adverse, direct and indirect, and cumulative impacts of the Project related to the bio-physical and socio-economic environment. Transboundary impacts are scoped out.

6.2 Assessment methodology

To ensure a robust impact assessment, the significance of each topic has been evaluated based on impact magnitude and environmental sensitivity. The framework for assessing magnitude, sensitivity, and impact significance is outlined below. Mitigation and management measures are considered for each E&S aspect to determine the overall residual impact significance.

6.2.1 Receptor sensitivity

Sensitivity criteria for receptors are categorised into high, medium, or low. Criteria used to determine the receptor sensitivity are provided in Table 61. Each topic specific chapter will further define the relevant receptors and assigned a receptor sensitivity based on these criteria.

Table 61: Generic criteria for the allocation of Receptor sensitivity – criteria for allocation

Sensitivity	Physical Receptor	Human Receptor	Biodiversity Receptor	Climate (physical)
High	Little or no capacity to absorb proposed changes and has national or international value e.g., receptors where people or operations are particularly susceptible to noise or air	Receptors with high vulnerability and permanent presence within the direct or indirect AOI (e.g., school, poor or vulnerable household, hospital). No capacity to absorb project changes or no opportunity for mitigation.	Substantial loss of ecological functionality	Climate variability will threaten the sustainability of the project (e.g., work may be precluded from taking place during certain months of the year).

Sensitivity	Physical Receptor	Human Receptor	Biodiversity Receptor	Climate (physical)
	quality changes).			
Medium	Moderate capacity to absorb proposed changes e.g., where it may cause some discomfort or distraction or disturbance	Receptors with moderate to high vulnerability and or somewhat affected by project impacts. Limited capacity to absorb changes. Potential opportunities for mitigation	Moderate but sustainable change which stabilises under constant presence of impact source, with ecological functionality maintained	Potential impacts that can be addressed through management actions (e.g., design, implementation management).
Low	Good capacity to absorb proposed changes and not protected or has low value e.g., receptors where the disturbance is minimal.	Receptors with low to moderate vulnerability or are located in the AOI infrequently. Good capacity to absorb changes with no lasting effects, or good access to mitigation measures.	Species or community unaffected or marginally affected	Potential impact does not affect the sustainability of the Project.

6.2.2 Impact magnitude

The magnitude of the potential impact is determined based on the professional judgement of the specialist undertaking the assessment considering the five criteria provided in Table 62. Where impacts can also be quantified and compared against national or international standards these are also considered. The temporal influence "duration" has been assessed by considering the existing baseline conditions (environmental, socio-economic and biological) over the expected duration of the Project activities as listed below:

- site establishment and civil works (3-6 months);
- tower installation (11 months);
- site operation (30-40 years);
- decommissioning (18 months).

Table 62: Determination of magnitude – example criteria for allocation

Magnitude	Intensity Compliance	Duration	Spatial extent	Reversibility	Likelihood/Frequency
High	High intensity / non-compliant / large numbers of people affected/ very disruptive	Beyond the construction phase or permanent change	Direct AOI & Indirect AOI	Permanent impact	Continuous
Medium	Medium intensity/ actions need to be taken to become fully compliant / medium disruption or disruption to vulnerable groups or sectors of the community or workforce / Quality of life diminished due to change in character	> 3 months up to completion of the construction phase	Indirect AOI	Reversable, but requires mitigation and/or compensation	Intermittent
Low	Low intensity /compliant / small numbers of people / non-intrusive or does not cause changes in quality of life	One off event or occurs for 3 months or less	Direct AOI	Reversible following end of phase under consideration	Infrequent / one-off event

6.2.3 Evaluation of significance

Based on the defined impact magnitude and receptor sensitivity, the significance of the impact is categorized as neutral, minor, moderate, major, or critical, as shown in Table 63. Impacts classified as moderate, major, or critical are prioritized within the management and implementation framework based on the following considerations:

- **Critical**: These effects represent key factors in the decision-making process. They are generally, but not exclusively, associated with impacts where mitigation is not practical or would be ineffective.
- **Major**: These effects are likely to be important considerations but where mitigation may be effectively employed such that resultant adverse effects are likely to have a Moderate or Slight significance.
- **Moderate**: These effects, if adverse, while important, are not likely to be key decision-making issues.
- **Minor**: These effects may be raised but are unlikely to be of importance in the decision-making process.
- **Neutral**: No effect, not significant, noise need not be considered as a determining factor in the decision-making process

Impacts are typically considered to be adverse, but it is also possible for positive impacts to be realised. Where positive impacts are identified in the sections below, these are assigned a degree of positive impact based on the sustainability (duration) and scale (number of receptors) of the positive outcomes.

Table 63: Significance evaluation

Significance		Magnitude					
		Negative			Positive		
		Low	Medium	High	Low	Medium	High
Receptor Sensitivity	Low	Neutral	Minor	Moderate	Neutral	Minor	Moderate
	Medium	Minor	Moderate	Major	Minor	Moderate	Major
	High	Moderate	Major	Critical	Moderate	Major	Critical

6.2.4 Mitigation, enhancement and monitoring

Mitigation measures control, reduce, eliminate, or offset adverse impacts and enhance potential beneficial impacts of a development. In the mitigation section of each topic, proposed mitigation actions in accordance with the mitigation hierarchy have been defined. This includes actions to avoid or reduce significant impacts to acceptable levels in accordance with national and international standards and to align with good industry practice (GIP) or to enhance the Project outcomes. The significance of impacts has been determined once the application of mitigation and management measures has been defined. (i.e., residual significance).

In general, the following hierarchy of mitigation measures has been applied to reduce, where possible, the significance of impacts to acceptable levels:

- avoid and reduce through design (embedded mitigation);
- abate impacts at source or receptor;
- repair, restore or reinstate to address temporary construction effects;
- compensate for loss or damage, such as replacement planting elsewhere.

Mitigation and management measures have been summarised in the Project environmental and social management plan (ESMP) (Volume IV). The Project ESMP also sets out how the framework environmental and social management system (ESMS) for implementing the requirements of the ESIA following where possible NEGK existing environmental management health and safety management and human resource policies systems. This is outlined further in chapter 9**Error! Reference source not found.** and in the Project ESMP.

In some cases, monitoring is also required to verify the successful implementation of mitigation measures or factors related to the Project. These are also outlined in the topic specific sections below.

6.2.5 Residual significance

The determination of residual significance of impacts takes into account any incorporated mitigation measures adopted by the Project during design or siting and will depend on the extent and duration of change, the number of people or size of the resource affected and their sensitivity to the change. Based on the above approach, residual impacts post mitigation identified as having major or moderate significance will be classified as significant impacts.

6.2.6 Data limitation and uncertainties

Any uncertainties associated with impact prediction or the sensitivity of receptors due to the absence of data or other limitation are presented in the topic specific chapters. Commitments concerning measures that should be put in place for further survey work, monitoring and/or environmental or social management to deal with the uncertainty are captured in the framework ESMP.

6.3 Cumulative impacts

Positive and negative cumulative impacts that may arise from the incremental impact of the proposed Project when added to other closely related past, present and probable future projects have been assessed. Potential cumulative effects may include:

- Combined effects – those likely to occur at areas where there is a concentration of activity (substations, mining activity, other project construction work, multiple OHTL routes).
- Spatial and temporal crowding – when many activities are carried out in too small an area at the same time.
- Strategic induced growth – macro scale due to the greater demand and availability of electricity and which will be an inevitable outcome of the Project (refer to needs case) and not considered further.

Each impact assessment section has considered the first two potential cumulative effects for the project in the direct and indirect AOI for each topic under consideration for all project activities (OHTL, substation works, road works).

The potential for impacts has considered:

- geographic scope;
- pinch points (substations, overlapping AOI for OHTL (existing and project), use of same access roads);
- consultation duration of 18 to 24 months (2023 to 2024) e.g. the twp neighbouring solar PV projects;
- project operation lifetime 30 to 40 years.

The assessment of cumulative impacts is based on information in the public domain regarding the identification of foreseeable projects in the region. Stakeholder engagement activities as described in chapter 5 have also helped to inform the assessment of potential cumulative impacts, in particular to identify neighbouring projects that might be undertaking construction works at the same time as the K-B OHTL construction works.

6.4 Transboundary impacts

The western end of the K-B OHTL is within 15 kilometres of the Kazakhstan border. No transboundary impacts are expected, so they are excluded from further assessment.

7 Impact Assessment

7.1 Air quality

7.1.1 Construction phase

The primary air quality (AQ) issue associated with dust and fugitive gas emissions from the construction phases is loss of amenity and/or nuisance caused by, for example, soiling of buildings, vegetation and laundry and reduced visibility.

Activities during site construction phase which are likely cause AQ impacts include:

- Removal of vegetation leading to exposure of bare soil to the wind and increased dust emissions.
- Site preparation and clearance work including grading, excavation of foundations and cement production for foundations leading to fugitive dust and gas emissions specifically PM_{10} and $PM_{2.5}$ and sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO) in the ROW and along delivery routes.
- Works for new access roads including creation of borrow pits and transport of materials to site.
- Use of temporary generators leading to an increase in visible exhaust smoke, fugitive emission of oxides of nitrogen (NO_x), volatile organic compounds (VOCs) and other fumes and gases.
- Use of site plant and vehicles generating particulate matter (PM_{10}) and oxides of nitrogen (NO_x) due to combustion of diesel fuel

The existing access road to the Kemin substation and along the northern part of the OHTL is comprised mainly of gravel which can have moderate dust raising potential during the site establishment phase compared with surfaced roads. When vehicles leave existing roads to access the ROW they will traverse vegetated landscapes for the most part and vehicle movement over this land type will also have a short term but moderate dust raising potential.

Construction activities with potential dust raising activities along the OHTL, access roads and substation will be short term and temporary over a period of one to two weeks at each tower work front over a 6-to-9-month duration in total. Fugitive exhaust emissions associated with vehicle movements and temporary generators will also be intermittent and short term and confined to the work sites and the roads. The greatest dust raising potential may be in connection with the creation of borrow pits for access road construction giving a moderate dust raising potential over a medium period of time (depending on how may borrow pits are opened for the Project).

The use of dust generating materials[126] is expected to be low in particular as cement production for foundations will be performed offsite. However, there is still potential for dust to be generated in connection with the transport and transfer of cement to site and dust caused by general vehicle movements, including transfer of waste materials off site.

Overall, dust generating activities and fugitive exhaust emissions pre-mitigation are deemed to be of MEDIUM magnitude for the entire construction phase.

7.1.2 Operation phase

There are no direct or point source emissions to air associated with the operation and maintenance (O&M) of the overhead lines. Air quality impacts from substations are minimal, primarily due to occasional emissions from backup generators or maintenance activities. Maintenance activities that may generate dust or vehicle emissions related to the overhead lines (OHL) and substations would be intermittent. Dust emissions from O&M activities are considered negligible and have not been assessed further.

Vehicle access to the substation sites and to the OHTL for maintenance purposes is expected to be minimal and intermittent. Therefore, emissions from such vehicles are considered negligible and have not been assessed further.

Management and mitigation measures for construction air quality identified in this ESIA (*Table 66*) are applicable across the whole project timeline including the O&M phase. Operational procedures for management of fugitive AQ will be implemented through NEGK's Environmental Management System (EMS) as detailed in section 8.0.

Sulphur hexafluoride (SF_6) emission can be a concern in substations because it is a potent greenhouse gas used as an electrical insulator. SF_6 is a colourless, odourless gas with excellent insulating properties. It effectively insulates high voltage equipment within substations, preventing short circuits and electrical arcing. SF_6 also allows for a more compact substation design compared to air insulated alternatives, saving space and resources. There are no normal operational releases SF_6 associated with the substation operations. Abnormal releases may arise during maintenance of circuit breakers contained within the substations. No gas insulated switchgear is proposed. As such there has been no further consideration of SF_6 for this Project.

7.1.3 Decommissioning phase

Key activities that could give rise to AQ impacts (dust and fugitive emissions) are:

- Demolition of plant, towers and electrical systems, removal of plant and electrical system materials from site, structural foundation removal; and decommissioning plant item

126 Dust generating materials may be considered to be fine powdery materials e.g., cement or other fine dry materials.

movements.
- Decommissioning traffic movements (removal of equipment and transfer of personnel to and from the worksites).

Decommissioning AQ impacts will be similar to those generated during the construction phase and are assigned a MEDIUM magnitude for the entire decommissioning phase pre-mitigation.

7.1.4 Cumulative impacts

Air quality cumulative impact could be significant if the construction programmes of neighbouring projects overlap in particular the solar PV projects (labelled C9 and C10 on the Receptor Map). Based on the information available at this time, the neighbouring PV project and wind farm (12km distant) will be completed by the time construction of this Project commences. No other construction projects with the potential for cumulative impacts are identified at this time.

7.1.5 Summary of impact magnitude

Table 64 summarizes the magnitude of the air quality impacts identified above.

Table 64: Summary of magnitude - air quality

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Construction Dust (site establishment, vehicles movements)	Medium	3 to 6 months	Within 200m of the Workfront /Substation boundary	Temporary during works only	High	Medium
Construction Fugitive exhaust emissions	Low	3 to 9 months	Within 200m of the workfront /Substation boundary	Temporary during works only	High	Medium
Decommissioning dust (site establishment, vehicles movements, cement batching)	Medium	3 to 9 months	Within 200m of the workfront /Substation boundary	Temporary during works only	High	Medium

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Decommissioning fugitive exhaust emissions	Low	3 to 6 months	Within 200m of the workfront /Substation boundary	Temporary during works only	High	Medium
Cumulative impacts	Low	3 to 6 months	Within 200m of the workfront /Substation boundary	Temporary during works only	Low	Low

7.1.6 Receptor sensitivity

Dust generating impacts along the OHTL ROW and at the substation location have been determined to be limited to 200m[127] either side of the OHTL ROW and 200m around the permanent substation boundary, the road used for delivery of materials and personnel to the tower foundation locations, and the construction laydown. The sensitivity of nearby receptors in the AOI is summarised in Table 65.

Table 65: Project AQ receptors

OHTL/ Substation	Sensitivity
Workers (at substation and along the OHTL route) – within 200 m of the works	Medium
Farm clusters/residential properties within 200m of the proposed works (F15, S3)	Medium
NABU Animal Rehabilitation centre/ Solar PV projects (C9 and C10/fish pond)	Medium
Archaeological features – within 200 m of the works	Medium

127 250 m is typically accepted as the distance from the source of impact where air quality impacts have dissipated to acceptable levels.

OHTL/ Substation	Sensitivity
Raptor nests within 500m of the OHTL (N1, N2, N5, N6)	Medium
Road users (unsurfaced roads)	Medium
Road users (surfaced roads)	Low
Nearby houses, commercial properties and communities outside 200m AOI.	Low

7.1.7 Mitigation, management and monitoring measures

Table 66 outlines GIP and feasible and cost-effective measures to prevent or minimise AQ impacts during the construction and decommissioning phases.

Table 66: AQ mitigation and management

Project phase	Mitigation and management measures
Design/Contract/Procurement	• OHL routing avoids existing settlements as far as possible. • Maintain at least 120 m between dust generating equipment and dust sensitive receptors and the OHTL, substation and access road where possible.
Construction – Project specific	• Demarcate specific delivery road and access tracks to points along the ROW and within the OHTL ROW and new substation site and ensure all workers stick to demarcated areas. • Plant and equipment to be located and operated at least 200 m from nearest sensitive receptors (NSRs) (F6, F15, S3, C9, C10), NABU Centre, fish pond, nests 01,02,05,06) • No vehicle transfer through DEU-10 and Kok-Moynok-2 . • Locate all borrow pits at least 200m from any sensitive receptors (human or ecological). • Use existing concrete batching plants in the local area for cement production or use pre-cast concrete blocks. • Following the SEP, inform nearby residents, including the NABU Centre and road users about the timing and duration of works at least 2 weeks before they commence. • Inform local community of the community grievance mechanism (provided in detail in the standalone SEP) which should be available for the neighbouring land users to submit any grievances including those related to dust generation.

Project phase	Mitigation and management measures
GIP [128]	• Excavation, handling and transport of erodible materials shall be avoided under high wind conditions where practicable. • Control fugitive dust emissions using water or other control measures such as chemical bonding agent or aggregate. • All workers must wear personal protective equipment (PPE). • Minimise dust from material handling sources and from open area sources, including storage piles, by using control measures such as covering, seeding or fencing stockpiles to prevent wind whipping • Enforce speed limits and limit vehicle movements to a maximum of 15 km/h for project vehicles on unsurfaced roads. • Ensure no bonfires or open burning of materials are permitted at the site. • Ensure that all vehicles carrying loose or potentially dusty material to or from the site are fully covered. • Guarantee that vehicle engines and equipment on site are not left running unnecessarily. • Reduce the movement of construction traffic around the site as much as possible. • Where feasible, use low sulphur fuels to lower SO_2 emissions. • Avoid operating equipment unnecessarily. • Obtain maintenance logs of all vehicles before start of works to confirm vehicles meet national standards for exhaust emissions. • Toolbox talks to all workers on the management of dust.
Operation	• Apply GIP (as defined above) during maintenance works implemented via the NEGK operational ESMS.
Compensation / Enhancement	• None identified.
Monitoring	• Daily visual inspection and monitoring of dust episodes, soiling of vegetation, dust resuspension on the roads and dust clouds at OHTL active work fronts and substations. • Daily visual inspection at NSR (F6, F15, S3, C9, C10), NABU Centre, fish pond, nests 01,02,05,06) during active work periods within 200m. • Record incidents that cause dust, either on- or off-site, and the action taken to resolve the situation via the incident reporting procedure established as part of the construction ESMS. • Perform inspection of concrete batching at offsite batching plant locations for compliance with GIP (e.g., covered stockpiles, sealed hoppers).

128 GIP for air managing air quality impacts can be referred to in https://www.rbkc.gov.uk/pdf/Document%2012%20-%20BRE%20-%20Control%20of%20Dust%20from%20Construction%20and%20Demolition%20Activities.pdf ii) IFC EHS Guidelines General.

Project phase	Mitigation and management measures
	• Review incident log and community grievance log monthly to confirm trends related to dust episodes.

7.1.8 Residual significance

Following the application of the mitigation measures outlined in Table 66, the magnitude of the impact is expected to reduce for all receptors and in particular the NSRs that fall within 200 m of temporary works sites. The residual significance post mitigation is summarised in Table 67. The assessment has indicated that AQ impacts due to the construction and decommissioning phase of each Project would not be significant.

Table 67: AQ residual significance

Adverse impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Construction dust (site establishment, vehicles movements, cement batching)	Medium	Medium (within 200m of the site) Low (outside 200M)	Low	Minor (Neutral all other receptors)
Fugitive exhaust emissions	Medium	Medium	Low	Minor (Neutral all other receptors)
Decommissioning dust (site establishment, vehicles movements, cement batching)	Medium	Medium (workers all other receptors Low)	Low	Minor (Neutral all other receptors)
Decommissioning fugitive exhaust emissions	Medium	Medium	Low	Minor (Neutral all other receptors)

7.1.9 Data limitations and uncertainty

None identified.

7.2 Environmental Noise

7.2.1 Construction phase

Increases in noise emissions can have adverse impact on the health of any nearby residents. The health effects include hearing impairment, sleep disturbance, interference with speech communication, mental-health and performance effects; effects on residential behaviour and annoyance; and interference with intended activities.[129]

The main noise generating activities during construction of the OHTL, substation and new access tracks are:

- Site preparation works including piling and excavation works, assembly of Project components, on-site traffic movements.
- Delivery of materials to the substation and OHTL tower work front.
- Vehicle noise associated with the arrival and departure of workers from each work front.

Noise generated during construction is typically from stationary and moving sources with heavy plant such as trucks, excavators typically generating the highest levels of noise. For the OHTL and new substation works, predicted noise levels will be in the order of 60 to 65 dB(A) up to 200 m from the noise source.

The noise generating activities at any OHTL tower work front will be temporary in nature occurring for a one to two-week period at each tower work front and then stopping as the OHTL construction team moves sequentially along the OHTL route. Noise generating activities will return during conductor stringing works with stringing equipment including large generators located approximately every six tower locations.

For the substation works, noise generating activities will be greatest during early groundworks and foundation excavation works. Noise generation activity at the station will be 8 hour per day for a duration of 4 months. Following groundworks, equipment installation and commissioning works will continue for another 2 months with lesser noise.

The total duration of noise generating activities will be approximately 12 months and expected to occur during daylight hours (7am to 6pm). Based on these assumptions noise impacts are expected to be mildly disruptive meaning the noise can be heard and may cause small changes in behaviour and/or attitude, but not to the extent that it will result in a change in the quality of life. Considering there will be a perceptible but only mildly disruptive change in noise conditions up to 200 m from the source and considering the short term and intermittent nature of the noise impact, the magnitude is described as **MEDIUM**.

129 WHO Guidelines for community noise

The magnitude of the impact from the increase in traffic noise is considered to be noticeable and may cause change in behaviour or attitude of certain community and ecological receptors. Given the low volume of traffic movements expected in relation to the Project, and the intermittent nature of the traffic movements to various work fronts, the magnitude of impact from construction traffic noise is expected to be Medium.

7.2.2 Operation phase

No significant noise is expected to be generated during the O&M phase. This has been scoped out from further assessment.

God International Practice (GIP) management and mitigation measures for construction noise identified in this ESIA (Table 70) are applicable to the O&M phase. Operational procedures for management of noise in accordance with GIP will be implemented through NEGK's Environmental Management System (EMS) as detailed in section 8.0.

7.2.3 Decommissioning phase

Decommissioning noise impacts will be similar to those generated during the construction phase. Key activities that could give rise to noise impacts are:

- Demolition of plant, towers, substation and electrical systems, removal of plant and electrical system materials from site, structural foundation removal; and decommissioning plant item movements.
- Decommissioning traffic movements (removal of equipment and transfer of personnel to and from the worksites).

The magnitude of impact from construction works and traffic movements are classed as the same as for the construction phase i.e., MEDIUM and LOW magnitude respectively.

7.2.4 Summary of impact magnitude

Table 68 summarises the impact magnitude for the impacts identified above.

Table 68: Summary of magnitude – noise

Activity	Intensity	Duration	Extent	Reversibility	Likelihood	Magnitude
Site preparation works	order of 60 to 65 dB(A) 200m from the noise source	3 to 6 months	Within 250m of the work activity	Temporary during works only	High	Medium

Activity	Intensity	Duration	Extent	Reversibility	Likelihood	Magnitude
	during daylight only					
Delivery of materials	order of 60 to 65 dB(A) 200m from the noise source during daylight only	1 to 3 months	Within 250m of the work activity and along the main road	Temporary during deliveries only	High	Medium

7.2.5 Receptor sensitivity

The AOI for noise impacts during construction and decommissioning phases is defined as 200 m[130]. This includes 200 m either side of the OHTL centre line, 200 m from the road used for delivery of vehicles, 200 m around the substation locations (new and existing), and from any temporary works area e.g., laydown area, accommodation camp.

The current noise baseline is low and strongly influenced by natural sources of sound e.g., wind or traffic noise. Spot check monitoring at key receptor location indicates baseline noise levels (LAeq avg) of between 35 and 47 dB(A) in the daytime. Nighttime noise levels (LAeq avg.) are lower and between 37 and 46dB(A).

The baseline study identified the following high sensitivity receptors within 200m of the OHTL centre line and substation and along access roads.

- NABU Centre
- Settlements and farms within 200m of the OHTL
- Fish pond
- Raptor Nests within 500m of the OHTL (N1, N2, N5, N6 , refer to section 4.6.5.2 for details)
- Settlement of DEU-10 and Kok-Moynok-2

Given the low background noise level, receptors in the vicinity of the OHTL are conservatively assumed to have a MEDIUM sensitivity to changes in noise as a result of the construction works.

130 200m is typically accepted as the distance from the source of impact where noise impacts may fall to perceptible levels

Table 69: Project noise receptors

OHTL	Sensitivity
Workers (at substation, along the OHTL route) – within 200 m of the works	Medium
Farm clusters/residential properties within 200m of the proposed works (F15, S3) or along access roads (DEU-10 and Kok-Moynok-2)	Medium
NABU Animal Rehabilitation centre/ Solar PV projects (C9 and C10)/fish pond)	Medium
Raptor nests within 500m of the OHTL (N1, N2, N5, N6)	Medium
Road users (unsurfaced roads) (outside 200 m buffer zone)	Medium
General road users (surfaced roads)	Low
Nearby houses, commercial properties and communities outside 200m AOI.)	Low

7.2.6 Cumulative impacts

Noise impacts are expected to be contained to the direct AOI (200 m from the proposed works). Nosie cumulative impact could be significant if the construction programmes of neighbouring projects overlap (PV Project C9 and C10). Based on the information available at this time, the PV project C9 will be completed by the time construction of this Project commences, while PV Project C10 is still in early development stages and is not expected to commence work before the completion of the Project works.

7.2.7 Mitigation, management measures

Table 70 outlines GIP and other project specific feasible and cost-effective measures to prevent or minimise environmental noise impacts.

Table 70: Noise mitigation and management

Project phase	Mitigation and management measures
Design / Contract	• Line routing to maintain at least 120 m between sensitive receptors and the line route where possible.
Construction - Project Specific	• Keep normal working hours between 7am and 6pm Monday to Saturday.

Project phase	Mitigation and management measures
	• Plant and equipment to be located and operated at least 200 m from nearest sensitive receptors (NSRs) (F6, F15, S3, C9, C10), NABU Centre, fish pond, Nests 01, 02, 05, 06). • Locate all borrow pits at least 200m from any sensitive receptors (human or ecological). • Avoid blasting. • Prohibit night-time working. • Following the SEP, inform nearby residents, including the NABU Centre and road users about the timing and duration of works at least 2 weeks before they commence. • Inform local community of the community grievance mechanism (provided in detail in the standalone SEP) which should be available for the neighbouring land users to submit any grievances including those related to noise. • Avoid transportation of equipment, workers through DEU-10 and Kok-Moynok-2 (refer to section 7.9).
GIP	• Position plant items as far as practically possible from sensitive receptors. • Use quietest work methods and plant items where practicable. • Equipment to be properly maintained and fitted with appropriate noise control at all times. • Avoid unnecessary revving of engines. • Vehicles are not permitted to idle with engines on. • Switch all equipment off when not in use. • Locate static plant (e.g., generators) to take advantage of any screening to break the line of sight from receptors. • Brief site operatives to keep noise to a minimum.
Operation	• Apply GIP (as defined above) during maintenance works implemented via the NEGK operational ESMS.
Compensation / Enhancement	• None identified.
Monitoring	• Spot check monitoring performed during construction at NABU Centre/F6, S3, F15, Nests 01,02, 05, 06) during active work periods within 200m. • Monitor community grievance log for noise related complaints. • Conduct noise monitoring in the event of a noise complaint or evidence of exceedance of community noise guidelines values.

7.2.8 Residual significance

Following the application of the mitigation measures outlined in Table 70, the magnitude of the impact is expected to reduce for all receptors and in particular those that may fall within 200 m of temporary works sites (e.g.,NABU Centre, farm clusters). The residual significance post mitigation is summarised as follows. The assessment has indicated that noise impacts due to the construction and decommissioning phase of each Project would not be significant.

Table 71: Noise residual significance

Adverse	Magnitude (pre-mitigation)	Receptor Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Construction site works (clearance, ground works, erection)	Medium	Medium	Low	Minor
Construction traffic movements	Medium	Medium	Low	Minor
Decommissioning site works	Medium	Medium	Low	Minor
Decommissioning traffic movements	Medium	Medium	Low	Minor

7.2.9 Data limitations and uncertainty

None identified.

7.3 Solid Waste

7.3.1 Potential impacts

Solid waste will be generated during the construction of the OHTL, substation and access roads, OHTL maintenance works and decommissioning. Typical waste streams (hazardous and non-hazardous) expected to be generated during the construction, operation and decommissioning phase of the OHTL are summarised in Table 72 below. Hazardous waste shares the properties of a hazardous material (such as ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed.

Table 72: Typical waste streams expected to be generated during the construction, operation and decommissioning phase of the OHTL work

Waste type (*hazardous)	Hazard Class (I, II, III, IV)	Overhead line	Substation (Kemin)	Balykchy SS (New)	Access Roads (new)	Hazardous/ non-hazardous status pursuant to Directive 2008/98/EC	Estimated Volume (tonnes)
Existing Cabling (may contain oil)	II	N/A	✓	N/A	N/A	Hazardous	Not defined at this time (ND)
Waste Electrical and Electronic Equipment (such as old transformers and reactors, with and without PCBs) *	N/A	N/A	✓	N/A	N/A	Hazardous	ND
Contaminated Soils*	N/A	X	X	X	X	Hazardous	0
Brickwork	III, V	X	✓	X	X	Non-hazardous	ND
Concrete	III, V	✓	✓	✓	X	Non-hazardous	ND
Asbestos*[131]	I, II	X	✓	X	X	Hazardous	0
Steel	V	X	X	X	X	Non-hazardous	ND
Copper	IV	✓	✓	✓	X	Non-hazardous	ND
Mercury*	I	✓	✓	✓	X	Hazardous	ND
General waste	N/A	✓	✓	✓	✓	Non-hazardous	TBC
Timber	V	✓	✓	✓	X	Non-hazardous	TBC
Soils and stones, topsoil	V	✓	✓	✓	✓	Non-hazardous	TBC

131 In accordance with EBRD PR3 and relevant international conventions on waste, asbestos is not permitted to be used and will be prohibited explicitly in relevant project contracts. It's use is not considered further.

Waste type (*hazardous)	Hazard Class (I, II, III, IV)	Overhead line	Substation (Kemin)	Balykchy SS (New)	Access Roads (new)	Hazardous/ non-hazardous status pursuant to Directive 2008/98/EC	Estimated Volume (tonnes)
Temporary fencing, gates and troughs	N/A	✓	✓	✓	✓	Non-hazardous	TBC
Topsoil, timber, brash, fence posts, wire etc.	N/A	✓	✓	✓	✓	Non-hazardous	TBC
Tarmac/made ground (rubble/hardcore/piling mats)	V	✓	✓	✓	✓	Non-hazardous	TBC
Batteries*	II, III	✓	✓	✓	✓	Hazardous	TBC
Fluorescent tubes*	N/A	X	✓	✓	X	Hazardous	TBC
Printer cartridges*	N/A	✓	✓	✓	✓	Hazardous	TBC
Concrete washout	III, V	✓	✓	✓	✓	Non-hazardous	TBC
Waste oils/ sludges*	I, II, III, IV	✓	✓	✓	✓		TBC
Mastic Tubes	N/A	✓	✓	✓	✓	Non-hazardous	TBC
Solvents*	I, III	✓	✓	✓	✓	Hazardous	TBC
Paints*	N/A	✓	✓	✓	✓	Hazardous	TBC
Aerosols*	N/A	✓	✓	✓	✓	Hazardous	TBC
Used spill kits*	N/A	✓	✓	✓	✓	Hazardous	TBC
Canteen waste, safety equipment	V	✓	✓	✓	✓	Non-hazardous	TBC
Mixed metals	N/A	✓	✓	✓	✓	Non-hazardous	TBC
Packaging waste	V	✓	✓	✓	✓	Non-hazardous	TBC
Sanitary wastewater*	N/A	✓	✓	✓	✓	Hazardous	TBC
Septic tank waste*	N/A	✓	✓	✓	✓	Hazardous	TBC
Plastics	IV	✓	✓	✓	✓	Non-hazardous	TBC
Ceramics	III, V	✓	✓	✓	✓	Non-hazardous	TBC
Paper/ cardboard	II, IV, V	✓	✓	✓	✓	Non-hazardous	TBC
Glass	II	✓	✓	✓	✓	Non-hazardous	TBC

7.3.1.1 Construction phase

The Project ESMP will require the EPC Contractor to deal with waste in accordance with GIP duty of care principles and the waste hierarchy - Avoidance, reduction, recycling re-use, disposal. The EPC contract will place a requirement on contractors to segregate waste on site to maximise opportunities for recycling as far as possible. Waste disposal facilities will be identified through consultation with relevant municipalities and following EPC contractor audits of the waste disposal facilities for alignment with GIP.

During construction the expected volumes of all wastes will be as defined in Table 72. The overall volume of waste to be generated is expected to be low.

To manage waste at the work front's waste generated there will be collected and then transferred to a central storage and segregation area (e.g. laydown areas at either end of the OHTL). Waste from here will be segregated and stored for onward transportation and ultimately disposal at a licenced facility within Kyrgyzstan in accordance with national requirements and GIP. General waste (including non-hazardous construction waste) will be disposed to a municipal landfill designated for general or construction waste or both following national standards for labelling, segregation, transportation and disposal. Municipal Solid Waste (MSW) landfills can be used to dispose of construction waste and some types of industrial waste rated at Hazard Class III and IV however this requires a special approval from a respective Centre for Sanitary and Epidemiological Supervision (CSES).

Hazardous wastes including oils, can be treated in-country in accordance with GIP principles for waste. The nearest hazardous waste disposal location aligned with GIP is understood to be in Bishkek. During construction, activities with the potential to generate impacts relating to waste include:

- Inadequate handling, transfer and disposal of general waste leads to uncontrolled releases to land, air, groundwater leading to degradation and pollution of the receiving environment and potential fines and/or penalties under national regulations.
- Inadequate handling, transfer and disposal of hazardous waste leads to uncontrolled releases to land, air, groundwater leading to degradation and pollution of the receiving environment and potential fines and/or penalties under national regulations.
- Poor handling and storage of wastes can lead to health impacts on workers and local community (instruction of pests etc.).

Based on the anticipated waste streams, the waste volumes predicted to be generated and the short-term nature of the works the magnitude of the impact for general waste is deemed to be LOW. For hazardous wastes, the uncertainty around the availability of GIP aligned disposal facilities makes the magnitude of the risk Medium.

7.3.1.2 Operation phase

During maintenance works, wastes will be dealt with in accordance with NEGK's standard operating procedure for waste management and national regulations. Closed bins will be used for non-hazardous waste and sealed contained for hazardous waste to prevent contamination. Hazardous waste will be labelled. Similar types of low-risk hazardous and non-hazardous waste are expected during both construction and operation phases, however, during operation the anticipated waste volumes will be lower. The magnitude of the impact is deemed to be LOW.

7.3.1.3 Decommissioning phase

Waste streams generated during the decommissioning phase will be the same as per the construction phase except with the addition of additional waste streams arising from the decommissioning of the main structural and electrical components of the OHTL and substation. Removed parts will be re-used, recycled or disposed following GIP and options available in-country at the time of decommissioning. It is typical to recycle and reuse poles and transmission line materials whenever possible. Conductor wires can be recycled for their metal content but due to the thickness and rigidity there are few alternate uses for conductor wire. As used conductor wire is unsuitable for reuse in new transmission or distribution lines, it will be disposed to landfill following GIP and available practices in-country.

Following removal of the line, the right-of-way will be restored to the surrounding land use. This process often includes filling in pole locations with gravel, clean fill and topsoil, replacing topsoil and restoring the contours of the landscape.

The magnitude of the potential waste generated is conservatively estimated to be MEDIUM.

7.3.1.4 Cumulative impacts

No cumulative waste impacts are anticipated.

7.3.2 Summary of impact magnitude

Table 73 summarise the magnitude of solid waste impacts identified above.

Table 73: Summary of impact magnitude – waste

Activity	Duration	Intensity	Likelihood	Extent	Magnitude
General waste management (construction)	Medium	Medium	High	Direct AOI	Low
Hazardous waste management (construction)	Medium	Medium	High	Direct AOI	Medium

Activity	Duration	Intensity	Likelihood	Extent	Magnitude
General waste management (decommissioning)	Medium	Medium	High	Direct AOI	Medium
Operational waste (general)	Intermittent over long duration	Low	High	Direct AOI	Low
Decommissioning waste (general)	Medium	Medium	High	Direct AOI	Medium

7.3.3 Receptor sensitivity

The availability of suitable waste facilities aligned with GIP for general waste and hazardous waste is poor. Regulated waste transportation and disposal providers for general and hazardous waste do exist within Kyrgyzstan at the provincial level, however there is limited capacity to manage this at the local level and landfill management practices in particular are not aligned with GIP. Options for recycling decommissioned equipment is also limited.

Table 74: Project waste receptors

OHTL	Sensitivity
General waste providers (transportation and disposal)	Medium
Hazardous waste providers (transportation and disposal)	Medium
Workers and community	Low
Hazardous processing and recycling services (decommissioning)	Medium

7.3.4 Mitigation, management measures

Table 75 outlines the project specific mitigation and GIP to prevent or minimise solid waste impacts for each project phase and monitoring and enhancement requirements where relevant.

Table 75: Waste mitigation and management

Phase	Mitigation and Management Measures
Design/Contract	• EPC Contract to prohibit the following materials: • asbestos;

Phase	Mitigation and Management Measures
	• PCB containing materials; • lead based paints; • pesticide, herbicides as defined under Stockholm convention. • Proposed offsite manufacture of foundation blocks. • EPC contract to state that waste must be segregated at site and where possible options for recycling adopted.
Construction - Project Specific	• Develop EPC construction site waste management plan as part of the EPC ESMS. • Liaise with local municipality to identify the available list of waste contractors. • EPC to sign contract with waste management providers. • EPC to perform duty of care audit of the proposed general waste, recycling, construction waste and hazardous waste disposal facilities in Kyrgyzstan to confirm compliance with GIP. • Disposal of solid waste will be at the closest sanitary landfill to the project site that aligns with GIP. The minimum criteria that define a sanitary landfill are identified in the ESMP. If any of the requirements are not met, the disposal facility will not be used for the purpose of disposal of solid waste for the project and the next closest sanitary landfill will be identified. Endpoint disposal facilities must be approved for use by the Lenders at least 1 month prior to commencement of construction. • EPC Contractor E&S Manager will be required to undertake an inspection on the final waste disposal facilities that the authorized contractors will utilize for disposal of waste streams. The inspection will aim to ensure that the disposal facilities are management and operated in line with Good International Practice (GIP).
Construction - Good International Practice	• A waste manifest (or Chain of Custody Form) will be used as per which details the type/ amount of waste that is generated by EPC Contractor, transferred by the licensed waste collector from the site and disposed at final location. • EPC will define and demarcate dedicated temporary waste collection site at each work front (or OHTL section), and for substation and access roads. • Remove all waste at work front on a daily basis to the centralised waste handling areas (construction camp). • Avoid, minimise the generation of hazardous and non-hazardous waste materials as far as is practicable. • Apply GIP for the handling, segregation, transportation and disposal of waste of offsite disposal. • Explore options for recycling based on the availability of handling facilities in the region. • Train workers on their rights regarding working with hazardous wastes (e.g., PPE) and the correct way to handle and dispose of

Phase	Mitigation and Management Measures
	waste.
Operation & Maintenance	• Develop O&M waste management plan for the Balykchy substation including GIP outlined above as part of the NEGK operations ESMS • Develop operation waste management strategy for O&M of OHTL.
Decommissioning	• Develop decommissioning waste management plan.
Enhancement	• Set targets for recycling or re-use of equipment in the ESMP.
Monitoring	• Weekly and monthly waste generation volumes for construction wastes (segregated by waste stream). • Operational waste streams and monthly volume of waste generated (per type) • Waste contracts with authorised waste disposal facilities •

7.3.5 Residual significance

Following the application of the mitigation measures outlined in Table 75 the magnitude of the impact is expected to reduce for all receptors. The residual significance post mitigation is summarised in Table 76. The assessment has indicated that waste impacts due to the construction and decommissioning phase of each Project would not be significant.

Table 76: Waste residual significance

Impact and Effect	Magnitude pre-mitigation	Sensitivity	Magnitude	Residual significance (post mitigation)
General waste management (construction)	Medium	Medium	Low	Minor
Hazardous waste management (construction)	Medium	Medium	Low	Minor
Health impacts on workers and community	Low	Low	Low	Negligible
General waste management (decommissioning)	Medium	Medium	Low	Minor

Impact and Effect	Magnitude pre-mitigation	Sensitivity	Magnitude	Residual significance (post mitigation)
Operational waste (general)	Low	Low	Low	Neutral
Decommissioning waste (general)	Medium	Medium	Low	Minor

7.3.6 Data limitations and uncertainty

None identified.

7.4 Climate resilience

7.4.1 Potential impacts

The Task Force for Climate Resilience categorised climate related risks as one or more of the following:

- market and technology shifts
- policy and legal
- reputation
- physical risks

7.4.1.1 Construction and operation phase

Considering these four categories of particular relevance to the Project are physical risks to project infrastructure (including worker health risks). Market and technology shifts, reputation and policy risks are not considered relevant for assessment in this ESIA. It is worth noting however, that the Project can be considered to have positive impact on the market and technology shifts required to improve climate resilience as describe in the needs case assessment which highlights the Project contribution to supporting the transition of the Kyrgyzstan energy sector to low carbon through the deployment of a stable and efficient grid connection for the purpose of a resilience power network capable of connecting future renewable projects.

Considering the climate risk projections outlined in the baseline section, the Project will be susceptible to climate related risks during the construction and operational lifetime of the asset (expected to be 30 to 40 years (2026-2066).

Climate risk screening has identified the following potential events, relevant to the Project construction, operation and decommissioning in Kyrgyzstan, which may impact the workforce and physical infrastructure:

- Increased wind speeds

- extreme rain events;
- potential for prolonged periods of extreme heat during the summer months.

7.4.1.2 Decommissioning phase

The impact during the decommissioning phase may be even more pronounced that the construction phase given that this will be at least 40 years in the future when the full extent of the climate risk projections will have been realised. Nevertheless, overall, the magnitude of these impacts is considered MEDIUM considering the relatively short period over which these works will take place.

7.4.2 Summary of impact magnitude

Table 77 summarise the magnitude of climate impacts identified above.

Table 77: Summary of impact magnitude – climate

Activity	Duration	Intensity	Likelihood	Extent	Magnitude
Increased wind speeds	30 to 40 years	Medium	Medum	Medum	Medium
Increasing temperature	30 to 40 years	Medium	Medum	Medum	Medium
Extreme rain events	30 to 40 years	Medium	Medum	Medum	Medium

7.4.3 Receptor sensitivity

The main receptors for climate change risks at the project level are the project infrastructure and workers. Based on the climate change projections and the duration of the operations phase, all infrastructure is considered to have a medium sensitivity to change. Workers are assigned a high-risk sensitivity based on there being little to no capacity to avoid climate related events during the construction phase and their susceptibility increases into the O&M phase, although the duration of exposure is likely to be less frequency, refer to Table 78 for a summary of the receptor categorisation.

Table 78: Project climate resilience receptors

OHTL	Sensitivity
Physical Infrastructure	Medium
Workers	High

7.4.4 Mitigation, management measures

Table 79 outlines GIP and other project specific feasible and cost-effective measures to prevent or minimise environmental noise impacts.

Table 79: Climate resilience mitigation and management

Project phase	Mitigation and management measures
Design	• Design OHTL for climate projections up to 2085 • Consider need to reinforce the structures or higher design standards (stronger winds, higher temperatures). • Design road to consider short-term, extreme weather events. • Design any drainage to account for increased or short-term extreme precipitation patters. • Specify more effective cooling for substations and transformers, including retrofitting measures, improved shading (through greening), and choice of cooler locations where possible around the substation.
Construction - Project specific	• Prohibit lifting or elevated work in wind conditions more than 10 km/hr. • Ensure sufficient supply of potable water (4L per person/per day) at the work fronts. • Ensure sufficient shelter/shade during summer months. • Provide extra rest periods for workers when temperatures exceed 35ºC. • Ensure workers are not penalised for taking extra rest breaks during periods of extreme heat. • Consider risk of landslides during task risk assessments to account for localised risks.
Good International Practice	• Consider risk of heatwave, landslides and flash flooding (from extreme rain events) in all setting-to-work risk assessments. • Explain climate risk mitigation in worker induction (e.g. access to shade, water, emergency response) • Address climate risks (extreme heat, flooding and landslides) in emergency preparedness and response plan (EPRP).
Operation and Maintenance	• Implement GIP for all maintenance works established through NEGK operational ESMS. • Perform maintenance works in accordance with NEGK maintenance requirements
Enhancement/ opportunities	• None identified.
Monitoring	• Establish an early warning system for wind and extreme heat events through continuous weather monitoring and document in the Emergency preparedness and Response Plan (construction and operation).

7.4.5 Residual significance

Following the application of the mitigation measures outlined in Table 79, the magnitude of the impact is expected to reduce for all receptors. The residual significance post mitigation is summarised as follows. The assessment has indicated that climate related impacts during each phase of each Project would not be significant.

Table 80: Climate resilience residual significance

Adverse	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Increased wind speeds (Physical infrastructure)	Medium	Medium	Low	Minor
Increasing temperature (Physical infrastructure)	Medium	Medium	Low	Minor
Extreme rain events (Physical infrastructure)	Medium	Medium	Low	Minor
Climate related events that impact worker health (all phases)	Medium	High	Low	Moderate

7.4.6 Data limitations and uncertainty

None identified.

7.5 Water resource, wastewater and water quality

7.5.1 Construction phase

Project activities during site construction which are likely to impact the availability of water resources for competing water users or lead to contamination of sensitive water receptors include:

- General construction works lead to direct contamination of surface water courses (e.g. Chu river) and groundwater (O-3 m depth) from localised flooding or contaminated liquid runoff (e.g., oil spillages) and contaminated run-off leading to pollution of groundwater (in particular during extreme precipitation events).
- Additional water use during construction works leads to an indirect increased pressure of water availability for competing water users (e.g., for irrigation, watering animals

(herders), potable water consumption (e.g., villages of Cholok, Kok-Moynok1 and Kok-Moynok-2 and farms).

7.5.1.1 Wastewater discharges (direct and indirect)

For considering water quality impacts, the AOI for the construction works considers the direct AOI (OHTL route, substation boundary or road plus a 25 m buffer). All temporary work areas will likely be within the OHTL ROW (~78m), substation boundary or the road ROW and their respective buffer zones.

The OHTL ROW crosses the Chu River upstream of the village of Kok-Moynok-2, after which it turns southeast into the mountains. The route crosses two right tributaries of the Chu River and several seasonal streams within the gorges. Artificial ponds near the Kemin substation are used for irrigation or livestock watering. Additionally, artificial fishery ponds are currently under construction on the southern outskirts of the village of Kok-Moynok-2. Consultation on the draft ESIA revealed that some low lying pastures near Kok-Moynok-2 are also subject to infrequent flooding during period of May to September.

During site establishment and construction works for the OHTL, construction activities may generate liquid contaminants that may run off directly to surface or groundwater. In addition, extreme precipitation events leading to localised flooding may cause contaminated run-off to surface waters and groundwater. Extreme precipitation events typically happen in the wet season (late Autumn to early Spring) and can number up to 200 mm (7.9 in) per year on an upward trend.

Considering the frequency of extreme rain events, the short-term nature of the construction works at each work front/ substation, the volumes of liquids used during the construction process on site (mainly fuel, oils, greases, etc.) and the localised extent of the potentially contaminated run off, it is possible that there will be a detectable impact to surface water resources. In the worst-case scenario of wet season construction, the effects are likely to be highly localised and temporary. The overall impact magnitude is therefore considered to be Medium.

Septic tanks of 2,500 litres will treat sewage water during construction and operation will be used for onsite temporary storage prior to collection by the registered waste treatment company for disposal and treatment offsite. Offsite disposal following the requirements of the Hazardous Materials and Waste Management Plan. Volumes of sanitary wastewater are considered to be Low.

A description of the potential impacts and magnitude is provided below and summarised in Table 82.

7.5.1.2 Water use

Water use, in general, can have a negative impact on water availability and water quality (surface and groundwater). The construction of the Project infrastructure has the potential to compete for water resources with existing users which for this project is confirmed will be from the district water supply via tanker deliveries to site.

The Project will require water for construction works and domestic use. Potable water, and construction water will be sourced from the local Municipality water supply and delivered to site via tanker for general construction works, welfare requirements and commissioning (transformers). Potential impacts on water quality, construction works at the substations are likely to short-term duration and within the substation footprint. Direct water use will be primarily for dust suppression and temporary welfare facilities (e.g. sanitation, hygiene and other needs). Potable water is expected to be delivered by tanker from an offsite municipal source to service drinking and worker welfare needs at the construction camp. Bottled water is likely to be used for drinking at work fronts.

Another main water consumption activity will be connected with cement manufacture for foundation works. Water availability for cement manufacture will be under the permit of an existing offsite facility (the nearest existing concrete batching plant is adjacent to the Kemin Substation, but the final supplier (s) is still to be determined).

On-site construction water needs are estimated between 3000L and 4000L per day. Considering one small to medium sized water tanker on site may hold between 8000 and 10,000L, the daily water needs are considered to be Low magnitude.

Table 81*: Project water requirements for construction phase*

No.	Total Water Requirement	Magnitude	Unit	Assumptions
1	Water Requirement for Labours during construction	7,200,000	Litre	Considered construction period of 12 months and 100 labours to be at site per day on an average. Water requirement per labour to be 100 litres.
2	Water requirement for road construction	1,947,360	Litre	Road widths as per RFP, road lengths as per layout.

No.	Total Water Requirement	Magnitude	Unit	Assumptions
				Assumed 15 litres of water per m2 road surface area.
Total		22,543,376	Litre	

Source:

For the construction phase a consumption of 22,543,376 L/Year is estimated during the overall construction phase, including commissioning.

7.5.2 Operation phase

Water use during the operations phase has been scoped out.

The potential for groundwater or surface water contamination during maintenance works is also scoped out, noting that most maintenance works will be short-term, self-contained and operational procedures require maintenance works to remove all wastes (including liquid wastes) off-site for disposal in accordance with the NEGK waste management system.

7.5.3 Decommissioning phase

Decommissioning impacts are assumed to be the same a construction phase impacts.

7.5.4 Cumulative Impacts

Water use is relatively low and minimal discharges will be generated from the construction works and these are proposed to be managed locally using GIP. Combined effects as a result of other related project activities in the vicinity are not expected to result in any pressures on local water resources that will result in an adverse environmental impact. No cumulative water impacts have been identified

7.5.5 Summary of impact magnitude

Table 82 details the impact magnitude for the impacts identified above.

Table 82*: Summary of magnitude – water use and wastewater*

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Water use	Medium	3 to 6 months	Indirect AOI (municipal water supply)	Temporary during works only	Intermittent (during works only)	Low
Wastewater discharges (construction and decommissioning)	Medium	3 to 9 months	Within 250m of the Site boundary	Temporary during works only	Intermittent (during works only)	Medium
Wastewater discharges (sanitary wastewater)	Low	12 to 16 months	Indirect AOI	Temporary during works only	Intermittent (during works only)	Low

7.5.6 Receptor sensitivity

Some surface water features, or seasonally flooded areas are noted within the direct AOI. Groundwater and water resources feature relevant to the works, and their sensitivity is defined in Table 83.

Table 83: Project water resource receptors

OHTL	Sensitivity
Groundwater	Medium (groundwater, boreholes locally important for water supply to villages or water-dependent businesses – expected to be at a depth of approx. 1.5m)
Surface water courses (Chu river, tributaries, fishpond and irrigation channels, meadow near Kok-Moynok-2)	Medium
Municipal water supply	Medium

7.5.7 Mitigation, management measures

Table 84 outlines mitigation measures to avoid or minimise water use and contaminated run-off from the construction works.

Table 84: Water use and water quality mitigation and management

Project phase	Mitigation and management measures
Design	• Site OHTL towers outside protection set backs for rivers or at least 25 from surface water feature. • Site substation more than 25m from any surface water features. • Route access roads more than 25m from any surface water features. • Use of groundwater for potable or construction related purposes is prohibited. • Consult with local farmers before the start of construction on the location of any streams used for watering animals to define additional protection measures, including maintaining right of access.
Construction - Project Specific	• Prior to works commencing (in particular during the wet season, late autumn not early Spring), conduct consultation with Ministry of Emergency for any specific recommendations to minimise risks from localised flooding. • Drinking water at the construction work front to be provided by bottled water (equating to at last 4.0 litres per day per worker). • All cement to be delivered to site pre-mixed or pre-cast from third parties with approved water use licences. • Do not locate any temporary worksites within 50 m of surface water features or within protection setbacks. • Report all incidents relating to water features in incident log established by the EPC as part of the construction ESMS.
GIP	• At work fronts, use barriers between works and ground to minimise impacts from spills or other issues. • Ensure wastewater does not flow directly to ground. • All chemicals, fuels, and oils are stored at the laydown area at either end of the OHTL, not at the work fronts. • Any small quantities stored at the work front must be secured in a suitable container or vehicle overnight and when not in use. • There is no direct discharge of contaminated water or potentially contaminated water to the ground without prior treatment. • No herbicide to be used. • Do not refuel at the tower/stringing work front. All refuelling occurs at a dedicated refuelling site at either end of the OHTL or a refuelling station. • No concrete washout is to take place at tower work fronts. All cement trucks must return to the batching facility or a dedicated

Project phase	Mitigation and management measures
	wash-out facility at either end of the OHTL to perform cement washout. • Undertake works with hazardous liquids over an area of hardstanding or temporary gravel to avoid seepage to groundwater in the event of a spill. • Portable latrines to be provided at each work front. • General operational management requirements concerning good housekeeping during maintenance works and waste management and spill management provisions must be implemented.
Operation	• General operational management requirements concerning good housekeeping during maintenance works and waste management and spill management provisions must be implemented via ESMS. • All chemicals, fuels, and oils permanently stored at substation site must be in a designated areas in a secure and bunded facility that is capable of capturing 110 percent of the largest tank or 25% percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 liters and will be made of impervious, chemically resistant material.
Decommissioning	• As per construction phase
Enhancement	• If any water supplies are developed to support the Project (new borehole), these may be made available to the local community.
Monitoring	• Volume of construction water use tankered to site • Volume of potable water delivered to site. • Number of reported spills (zero or downward trend to be maintained) • No unauthorised release of contaminated or potentially contaminated water to ephemeral channels or ground (based on incident log) • No monitoring required for the operation phase.

7.5.8 Residual significance

Following the application of the mitigation measures outlined in Table 84, the magnitude of the impact is expected to reduce for all receptors and, in particular, those that may fall within or close to the 200 m buffer zone around the OHTL and access road ROW (e.g., herders, workers at the water pumping stations, users of the water stations). The residual significance post-mitigation is summarised in Table 85. The assessment has indicated that the significance of impacts on water resources and groundwater quality due to the construction and decommissioning works would be minor adverse and therefore insignificant.

Table 85: Water use and water quality residual significance

Impact	Magnitude Pre-mitigation	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Water use (construction)	Medium	Medium	Low	Minor
Water quality (surface water features)	Medium	Medium	Low	Minor
Wastewater discharges (sanitary wastewater)	Medium	Medium	Low	Minor
Water quality (streams) – decommissioning	Medium	Medium	Low	Minor
Water resource – decommissioning	Medium	Medium	Low	Minor

7.5.9 Data limitations and uncertainty

None identified.

7.6 Soils

7.6.1 Construction phase

During construction of the tower foundations, substation, access tracks and the temporary laydown area, impacts may include:

- Increased soil erosion due to permanent removal of vegetation and topsoil and compaction of soils from increased use of heavy machinery, off-road vehicle movements and storage of construction materials.
- Contamination of soils from construction activities at all locations.
- Deterioration of worker heath in particular during foundation excavation works due to the naturally elevated levels of heavy metals in the soils.

The soil along the OHTL ROW is characterized as brown desert-steppe soils and mountain chestnut soils. The steppe soils have small top soil layer (0 to 3 cm), low organic matter and nutrient content and highly susceptible to soil erosion by wind. The chestnut soils also have shallow organic layer (top soil layer), with low humus content and sparse vegetation primarily consists of short-grass steppe species (feather grass, fescue) and dwarf shrubs. The vegetation cover is a major factor in retaining the structure of the soils. Removal or compaction of this topsoil layer can have permanent consequences for habitat in the temporary disturbed area leading to the creation of stony landscape with little or no nutrient value.

Although vegetation removal will be localised within the tower worksite, short-term and temporary, without intervention, the likelihood of the disturbed area naturally returning to its original state is low based on the low organic matter and nitrogen content of the soil.

These factors can lead to a fundamental change in the soil conditions resulting in long term or permanent change over a wider area outside the direct AOI which would require significant intervention to return to the baseline.

At the substation site, the duration of works will be longer and the topsoil layer will be permanently removed to create an area of hardstanding within the substation boundary. The magnitude of this impact is defined as MEDIUM.

7.6.1.1.1 Contamination of soils

Construction works at the tower Workfront, substation and access roads can lead to the contamination of soils from:

- spills of oils;
- refuelling;
- use of chemicals;
- poor waste management.

The duration of the tower foundation construction works and access road construction works at each location is expected to be short-term (one to two weeks at each worksite). At the substation the duration will be longer but contained to within gravel areas.

The volume of fuel and chemicals on site is expected to be small. The magnitude of this impact is defined as MEDIUM.

7.6.2 Operation Phase

No impacts during normal operations and maintenance works are anticipated. During abnormal operating practices which may arise very infrequently or never, there is a potential for:

- Ris of firewater routing not ground in emergency event (substation).
- Risk of leakage from emergency generators and fuel storage and refilling transformers oil (substation)
- Leak to ground / spills during maintenance works (e.g. oils, solvents or paints).

These risks will have a low likelihood but if realised could result in a MEDIUM magnitude impact.

7.6.3 Decommissioning

Decommissioning impacts are assumed to be the same a construction phase impact.

7.6.4 Cumulative impacts

No cumulative soil impacts have been identified.

7.6.5 Summary of impact magnitude

Table 86 details the impact magnitude for the impacts identified above.

Table 86: Summary of magnitude – water use and wastewater

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Soil erosion	Medium	Short-term	Direct AOI	Temporary (can be revegetated)	High	Medium
Soil contamination (construction / decommissioning)	Medium	Short-term	Direct AOI	Temporary (can be cleaned up)	High	Medium
Soil contamination (O&M)	Medium	Long-term	Direct AOI	Temporary (can be cleaned up)	Low	Medium

7.6.6 Receptor sensitivity

The sensitivity of the soils along the OHTL route to erosion and contamination are summarised in Table 87.

Table 87: Project soil receptors

OHTL	Sensitivity
Brown desert-steppe soils and mountain chestnut soils	Medium

7.6.7 Mitigation, management measures

Table 88 outlines the project specific mitigation and GIIP to prevent or minimise soil impacts for each project phase and monitoring and enhancement requirements where relevant.

Table 88: Soils mitigation and management

Project phase	Mitigation and management measures
Design	• Adopt tension stringing technique to avoid impact on soils between the towers and stringing points. • Grade temporary access roads so that their slope is not too large to avoid the build-up of fast-running run-off water during extreme precipitation events.
Construction - Project Specific	• Develop soil / vegetation removal and erosion control plan • Concentrate earthworks in the dry season (summer) where possible. • Avoid total removal of vegetation at nominated worksites (see biodiversity section). • Confine traffic movement to designated routes. • Immediately restore the topsoil and vegetative cover using seeded restoration techniques for all temporarily disturbed areas, to minimise soil erosion. • For any area impacted by compaction, rehabilitate the compacted area to support the return of the impacted area to the original state as quickly as possible following completion of the works. This may require aeration of the topsoil, enrichment of the topsoil or reintroduction of selected species and shrubs. Do not rely on natural rehabilitation. • Ensure correct PPE for workers during excavation works.
Construction – GIP	• Reflect natural gradient and relief when reinstating soils. • When stripping, stockpiling or placing soil, do so in the driest condition possible and use tracked equipment where possible to reduce compaction. • Keep soil storage periods as short as possible. • Clearly define topsoil and sub-soil stockpiles of different soil materials at each work front for reuse of subsoil. • Use earthmoving plant that is appropriate to the size of the site, the volume of soil to be stripped and haul distances. • Topsoil will normally be stripped to a thickness defined by depth below the surface and a distinct colour change. • Adopt GIP for management for pollution prevention from using machines and equipment, refuelling, storage and handling of hazardous materials and management of wastes.
Operation	• Ensure GIIP measures for handling hazardous materials are included in the operational ESMS. • Address spills from hazardous material use in the operational EPRP.

	• Secondary containment for fuel and oil storage at all times during maintenance works • Spill kits, refuelling and oil refilling drip tray in key areas around site where oils/chemicals/fuels is stored or used. • All firewater to be routed to a collection pit for offsite treatment and disposal. • Spills to soils during abnormal operating procedure are addressed in the ESMP
Decommissioning	• Develop vegetation rehabilitation and restoration plan for OHTL ROW, access roads and substation. • General GIP , as per construction
Enhancement	• None identified.
Monitoring	• Five-year aftercare and monitoring program to ensure soil and associated vegetation cover is returned to its original state. • Visual inspections of leaks and spills • Record keeping or any incidents

7.6.8 Residual significance

The sensitivity of soils to erosion is considered to be high based on the balanced relationship between the habitats and soil structure and subsequent capacity to absorb any changes (Table 89).

Table 89: Soil residual significance

Adverse	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Soil erosion	Medium	Medium	Low	Minor
Soil contamination (construction / decommissioning)	High	Medium	Low	Minor
Soil contamination (O&M)	High	Medium	Low	Minor

7.6.9 Data limitations and uncertainty

None identified.

7.7 Electric and magnetic fields

7.7.1 Construction phase

There is no possibility of EMF impacts associated with the project's construction phase, since the electrical equipment will not be energised at this stage. The EMF impacts during the construction phase have not been scoped out and are not considered further in this ESIA.

7.7.2 Operation phase

During operation the following impacts are noted:

- short term health effects on electricity workers from exposure to EMF;
- short term health effects to members of the public from exposure to EMF.

Table 90 details EMF field values at various distances from the OHTL. The field values decrease to "ICNIRP Exposure Guidelines values" within 25 m from the OHTL centreline, i.e. within the proposed OHTL ROW.

The maximum magnetic field produced by an overhead line occurs directly beneath the conductors at mid-span, when the line operates at its highest current and lowest ground clearance.

Table 90: Magnetic and electric field from 500 kV OHTL at various distances from the centre line

500 kV	Magnetic Field (microteslas) uT	Electric Field (volts per metre)
Maximum field (under line) (ICNIRP Exposure Guidelines values)	100 (public) / 500 (worker)	5,000 (public) and 10,000 (workers)
Typical field (under line)	5-10	3000-5000
Typical field (25 m to side)	1-2	200-500

The setback distance for 500 kV OHTL is 30 m to each side of the outermost conductor equating to a ROW of approximately 78m. There are no permanent residential receptors within the ROW for the proposed OHTL. As all receptors are outside the ROW and far enough away not to experience EMF levels above the ICNRIP reference levels and therefore the magnitude of impact is deemed LOW.

GIP for applying ICNIRP guidelines for the general public indicates that values should also be observed in areas where the land use is such that exposure might be for a significant period. In the ROW (direct AOI), livestock farmers will continue to graze their livestock in the area under the OHTL during operation however, land users will not be directly beneath the OHTL for significant periods[132]. Overall, the possibility of receiving high-level short-term exposure to EMF in exceedance of ICNIRP 1998 exposure guidelines is negligible. Furthermore, the possible effects of EMFs on various animals have been studied several times, and no detectable effects of EMFs have been found. There is general agreement that EMFs have not been shown to have any detectable effects on crops, pasture grasses or native flora.

The overall impact magnitude from EMF on members of the public (including farmers) is categorised as LOW.

EMF levels connected with the substation exhibit similar falls in EMF levels within 25m from the substation boundary and therefore impact magnitude is also characterised as LOW.

Workers on the OHTL during operation are typically exposed to higher levels of EMF due to their proximity to the live OHTL and their relatively prolonged exposure period compared to members of the public, however, the exposure guidelines are not a strict for workers due to the exposure still being intermittent and infrequent.

For workers at the substation, the highest exposure field is usually produced by the lines and cables supplying the substation and not by the equipment inside it. If the substation itself produces a field outside its perimeter, particularly through its busbars and switchgear, it usually falls to background levels over the first few metres[133,134].

7.7.3 Decommissioning phase

There would be no exposure to EMF emissions once the OHTL is de-energised in advance of decommissioning works. EMF is only associated with cables that transmit electricity.

7.7.4 Cumulative impacts

Cumulative EMF effects require two or more OHTL near each other. For the northern section of the OHTL the lines run parallel with two other lines (220kV). The OHTL's ROW 30m either side of the outermost conductor does not overlap with the ROW of the adjacent OHTL's and therefore no cumulative impact is anticipated.

7.7.5 Summary of impact magnitude

The table below summarizes the magnitude for potential EMF impacts pre-mitigation.

132 Significant period of time is typically taken to mean a permanent residences of permanent grazing fields/paddocks.

133 Further information on substations and EMF can be obtained from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48308/1256-code-practice-emf-public-exp-guidelines.pdf

Table 91: Summary of magnitude - air quality

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
EMF exposure (workers)	Low	1 to 2 days (per project)	Within 25m of conductor	Permanent	High	Low
EMF exposure (public)	Low	Long-term intermittent	Within 25m of conductor	Permanent	High	Low
EMF exposure – livestock, natural habitats	Low	Long-term intermittent	Within 25m of conductor	Permanent	High	Low

7.7.6 Receptor sensitivity

Sensitive receptors in the AOI with the potential to be exposed to levels of EMF and their sensitivity to EMF impacts are summarised in Table 92. This is based on their proximity to the line, likely impact duration, and sensitivity to the issue. The sensitivity rating also considered that during the consultation process, many community members and farmers raised concerns about safety issued connected with working under the line and in close proximity to the line, including health impacts and safety impacts (risk of electrocution).

Table 92: Project EMF receptors

OHTL	Sensitivity
Livestock farmers	High (may spend some time within the ROW and consultation has revealed specific concerns on this topic)
Workers	Medium (may spend prolonged time within the ROW to undertake maintenance work)

7.7.7 Mitigation, management and monitoring measures

Table 93 outlines GIP and feasible and cost-effective measures to prevent or minimise EMF impacts.

Table 93: EMF mitigation and management

Project phase	Mitigation and management measures
Design/pre-construction	• Maintain line routing at least 25m either site of the central conductor between sensitive receptor and the line route to factor in ICNRIP EMF exposure guidance. • Design conductors following established guidance.
Construction - Project Specific	• Conduct awareness-raising activities with local farmers, herders and community members to inform about exposure levels when grazing livestock in the ROW.
GIP[135]	• Ensure workers training includes EMF safety program.
Operation	• Ensure workers training includes EMF safety program as part of the NEGK operational ESMS. • Conduct awareness-raising activities with local farmers, herders and community members to inform about exposure levels when grazing livestock in the ROW.
Decommissioning	• Ensure workers training includes EMF safety program
Compensation/ Enhancement	• None identified.
Monitoring	• None identified.

7.7.8 Residual Significance

Following the application of the mitigation measures outlined in Table 93, the magnitude of the impact is expected to reduce for all receptors and, in particular, those that may fall more than 25m from the OHTL (e.g., herders, workers). The residual significance post-mitigation is summarised in Table 94. The assessment has indicated that EMF impacts due to the operation of the OHTL would not be significant.

135 GIP for air managing air quality impacts can be referred to in https://www.rbkc.gov.uk/pdf/Document%2012%20-%20BRE%20-%20Control%20of%20Dust%20from%20Construction%20and%20Demolition%20Activities.pdf ii) IFC EHS Guidelines General

Table 94: EMF residual significance

Impact	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
EMF occupational exposure on workers	Low	Medium	Low	Minor
EMF exposure – the general public	Low	High	Low	Moderate
EMF exposure – livestock, natural habitats	Low	Low	Low	Neutral

7.7.9 Data limitations and uncertainty

None identified.

7.8 Landscape and Visual Impact

7.8.1 Construction impacts

The Zone of Visual Influence (ZVI) is defined as the extent of potential visibility to or from a specific area or feature. During scoping site visits by environmental specialists, a review was made of the ZVI for existing infrastructure developments and an indicative spatial scope has been defined for the Project area as approximately two kilometres from the OHTL ROW and 500m from the existing and proposed new substations to address the potential impacts on the existing landscape character and visual amenity (Figure 12).

For the construction phase of the Project landscape and visual impacts may arise from:

- Loss of vegetation cover and changes to landform;
- Change in tranquillity of the surrounding landscape;
- Localised light pollution;
- Presence of construction traffic, compound, plant and equipment;
- Site clearance, preparation and levelling;
- Development of borrow pits to provide aggregate for access road construction;
- Construction of the new access both temporary and permanent; and
- Re-routing and/or upgrade of the existing roads.

ROW preparation, site clearance, construction of the substation, access roads and towers, and the use of construction equipment will harm the landscape along the proposed route, and construction activity, lighting and traffic may disrupt the area's tranquillity. However, during construction, these effects would be temporary and transient. At any one location, activity may only be evident for a few weeks or months. Visual impacts from the temporary construction works will be short-term with temporary access roads, borrow pits and construction camps all being removed and landscape returned to pre-construction land type. Since construction impacts are of a temporary duration (3 to 9 months) and with a localised extent the likely impact magnitude on landscape character and visual amenity is deemed LOW.

7.8.2 Operation phase

Operational impacts have been considered specifically in relation to permanent changes in land-cover or permanent infrastructure and particular reference has been made to areas of visual sensitivity as identified during the scoping site visits and biodiversity assessments.

The effects are likely to include:

- Permanent removal of the existing vegetation affecting landscape character (considered in the biodiversity assessment, chapter 7.14); and
- Presence of towers and OHTL changing wilderness character and creating dominant visual elements.

Impacts vary in relation to the following characteristics:

- Topography – whether the topography is undulating or flat and therefore the ability of the line to merge into its surroundings;
- Presence of local receptors and their sensitivity to the change in landscape character, for instance tourism areas potentially have greater magnitude of impact;
- Presence of existing infrastructure including OHLs; and
- Landscape character of the area with good quality landscape, for instance designated areas.

The OHTL does not route within three kilometre of any protected landscape. The nearest official tourism areas are connected with the Issyk Kul lake which is more than six kilometres east from the southern termination point of the OHTL at the new Balykchy substation.

As noted in the baseline section, the areas is predominantly natural habitat consisting of scrub land, range land, mountainous areas, and riverine habitats. The Project ROW also passes through the Kok-Moynok Canyon which is the only section along the ROW that is deemed to have an attractive landscape that may be most sensitive to change. The canyon is a scenic location and one of the region's notable landmarks. At the time of this report's preparation, access to the canyon is unrestricted, and there is no tourism infrastructure in place. However, the canyon is part of the "Texey" Geopark 1 (an area that brings together scenic sites without assigning them any protected status). Walkers and users of the Kok-Moynok Canyon will have intermitted views of the overhead lines as depicted in Figure 138. This figure shows the area encompassing the canyon itself (no official boundaries exist; they were defined based on visual observations of dirt roads actively used by tourists within the quarry) as well as access routes from the Kok-Moynok-2 village. Arrows on the map indicating photo points are oriented in the direction the photographs were taken. These are described in more detail in Volume III, Technical Appendix - K-B Canyon Area Photo Report. An example of views from each Area are provided below. Each of the surveyed sections of the canyon has its own distinct characteristics, both in terms of aesthetic value and the layout of existing transmission lines. At all locations, views from the canyons are already impacted by existing OHTL resulting in the potential for wirescape.

- Area 1 – access point to the canyon where the visual transformation of the landscape is noticeable. From an open landscape to more narrow corridor.
- In Area 2, according to publicly available photo materials, the narrow canyon segment appears to be the most visited - it lies between the 220 kV line running along the access road and the planned line, though at a significant distance from both.
- In Area 3, the planned line may visually narrow the scenic corridor between the existing 220 kV lines, though this is more likely due to the presence of the conductors than the towers themselves.
- Area 4 offers a view of the rising terrain of the canyon, making all three lines clearly visible from the entrance. The most dramatic and visually prominent sections of the canyon begin near the planned line and continue toward the 500 kV line to the south

The following figures illustrate typical viewpoints from the Kok-Moynok canyon showing some existing lines from each Area 1 to 4.

In each location the magnitude of the impact from the introduction of a new line into this landscape is considered to be HIGH considering a permanent change that is a noticeable deterioration in the landscape character, and given the existing lines and the potential for wirescape.

Figure 134: Photopoint 2. Canyon access road (Area 1)

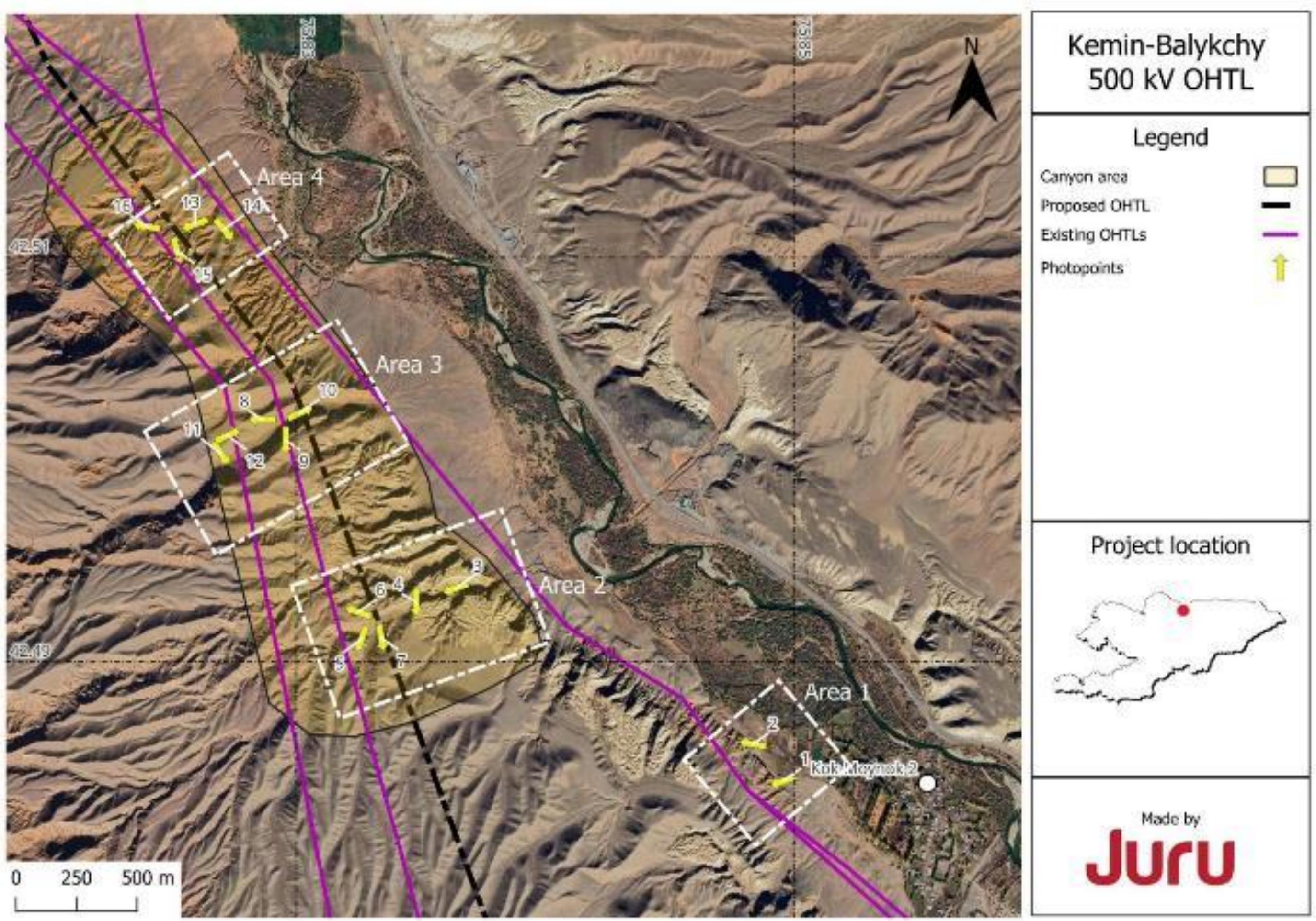
Figure 135: Photopoint 5. Existing 220kV line - central view (south) (Area 2)

Figure 136: Photopoint 9. Existing 220kV line tower - view to the right (east)

Figure 137: Photopoint 14. All three existing lines within the canyon area (east)

At the Kemin SS, the impact will not be noticeable as all works will be within the existing footprint. The Balykchy SS will be a new substation. It is located approximately 1km from the EM11 in stony landscape that is considered to be of low landscape and visual sensitivity and given it's proximity to the EM11 less sensitive to change. Nevertheless, the impact will be permanent and of an industrial nature and is categorised as MEDIUM.

Figure 138: Photopoints at the Kok-Moynok Canyon



7.8.3 Decommissioning

In the event that the OHTL or substation or other infrastructure is decommissioning the permanent visual and landscape impact will be removed. This is not considered further.

7.8.4 Cumulative

The presence of multiple transmission lines will lead to a combined visual pressure, including wire-scape.

7.8.5 Summary of impact magnitude

Table 95 summaries the impact magnitude for the impacts identified above.

Table 95: Summary of magnitude – LVI

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Construction - loss of vegetation cover (OHTL, substation and access roads)	Low	3-9 months	2km AOI	Reversible	High	Low
Construction nuisance visual impacts (vehicles, access roads) (OHTL, substation and access roads)	Low	3-9 months	2km AOI	Reversible	High	Low
Operation – permanent removal of existing vegetation (OHTL, substation and access roads)	Low	+25 years	2km AOI	Reversible	High	Medium

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Operation – presence of towers, OHL, ROW creating visual impact	Medium	+25 years	2km AOI	Reversible	High	High
Operation – cumulative impacts “wirescape”	Medium	+25 years	2km AOI	Reversible	High	High
Decommissioning - Presence of the removal plant and associated structures	High (Beneficial)	Short term	2km AOI	Reversible	Low	Medium (Beneficial)
Decommissioning Visual effect of removal plant and associated structures.	High (Beneficial)	Long term	2km AOI	Reversible	Low	Medium (Beneficial)

7.8.6 Receptor sensitivity

Key visual receptors in the AOI with the potential to be impacted by visual or landscape changes are summarised in Table 96. This is based on their proximity to the line, likely impact duration, and sensitivity to the issue.

Community consultation to date has not raised any general concerns related to LVI impact from farmers or residents. Durgin the ESIA stage key informant interviews with tourism providers did note some potential concerns regarding cumulative visual impact caused by the OHTL’s from viewpoints within the canyons. The Kok-Moynok canyons represent a landscape with value through tourism use and can be considered a good quality landscape, albeit undesignated and therefore they have been assigned a Medium sensitivity. The remaining sections of the OHTL are designated as low sensitivity based on their characterisation as low value landscape receptors.

Table 96: Project visual receptors

OHTL	Sensitivity
Livestock farmers/ All habitats along the line (except canyons)	Low
Tourists / Kok-Moynok canyons	Medium

7.8.7 Mitigation, management measures

Table 75 outlines the project specific mitigation and GIP to prevent or minimise solid waste impacts for each project phase and monitoring and enhancement requirements where relevant.

Table 97: LVI mitigation and management

Phase	Mitigation and Management Measures
Design/Contract	• Minimize number of changes of direction (angle towers) • Minimize overall length of the line as far as possible (fewer overall number of towers). • Avoid residential areas and other structures (e.g. fishponds) • Careful design of river crossings and routing through river valleys. • Where possible the Project will avoid locating towers along the skyline. • Construction compounds will be located away from sensitive landscape areas (e.g. at substation locations); • Minimise construction of new roads and removal of vegetation. • Where possible very steep slopes should be avoided; • Choose tree and hill backgrounds where possible; • Utilise background and foreground structures to reduce the apparent height and domination from towers from viewpoints
Construction - Project Specific	• Manage construction impacts related to short term visual and landscape impacts in the Project ESMP (dust, noise, lighting, vegetation removal). • construction traffic should avoid passing the settlements where possible (refer to chapter 7.9). • Where appropriate involve stakeholders in the final tower micrositing to minimise the impact.
Construction - Good International Practice	• Borrow pits will be fully re-instated and not left to turn into small water reservoirs areas unless they are close to human settlements so they can be used for water supply where the community is prepared to manage their use. This should be coordinated through the borrow pit management plan discussed in the EMMP.

Phase	Mitigation and Management Measures
	• Ensure disclosure of project program to local communities and users of the Kok-Moynok canyon (posters / noticeboards) to provide advance notice of works and potential disruption. • Disclosure Project grievance mechanism to local communities and users of the Kok-Moynok canyon (posters / noticeboards) to obtain feedback on any nuisance matters. • Lighting associated with the construction phase of the proposed development will be carefully designed to minimise the impact of light pollution at night; • Any planting lost due to the construction of the proposed development will be replaced with new planting of a similar species (see also section 7.14 – biodiversity); • Use excess earth to create local screening, • Where local population experience a grievance of any kind (including one of visual impact) grievances will be assessed and addressed. • The construction traffic should avoid passing the settlements where possible.
Operation & Maintenance	• Continued implementation of the Grievance mechanism • Coordination with the Kok-Moynok canyon for notifications relating to any planned or emergency maintenance works. • Localised planting around certain visual receptors (Kok-Moynok canyon) • Localized planting around lower-level infrastructure e.g. substation
Decommissioning	• Remove all above and below ground infrastructure and return landcover to pre-construction landscape type • As per GIP above
Enhancement	• Existing vegetation should be supplemented with additional native scrub and tree planting, where appropriate, in order to enhance local landscape character and screen views of the site in the long term. Implementation of this planting before construction commences would give the planting longer to establish, and assist in screening views of the works
Monitoring	• Grievance monitoring (dust, noise)

7.8.8 Residual significance

Following the application of the mitigation measures outlined in Table 75 the magnitude of the impact is expected to reduce for all receptors. The residual significance post mitigation is summarised in Table 98. The assessment has indicated that LVI impacts during the construction and decommissioning phase of each Project would not be significant. The findings show that construction residual impacts are insignificant as all temporary work areas are required to be returned to their pre-construction status. Permanent visual changes are deemed of moderate significance that are unavoidable. Given the scale of the Project and limited scope for specific mitigation measures related to landscape and visual impacts, this Chapter has identified a number of mitigation measures to seek to minimise effects at the local scale

Table 98: landscape and visual impacts

Impact and Effect	**Magnitude pre-mitigation**	**Sensitivity**	**Magnitude**	**Residual significance (post mitigation)**
Construction – loss of vegetation cover	Medium	Low - Medium (Kok-Moynok canyon)	Medium	Neutral to Minor
Construction nuisance visual impacts (vehicles, access roads)	Medium	Low - Medium (Kok-Moynok canyon)	Medium	Neutral to Minor
Operation – permanent removal of existing vegetation	Medium	Low - Medium (Kok-Moynok canyon)	Medium	Neutral to Minor
Operation – presence of towers, OHL, ROW creating visual impact	High	Low - Medium (Kok-Moynok canyon)	High	Moderate to Major
Operation – cumulative impacts “wirescape”	High	Low - Medium (Kok-Moynok canyon)	High	Moderate to Major
Decommissioning - Presence of the removal plant and associated structures	Medium (positive)	Low - Medium (Kok-Moynok canyon)	Medium	Minor to Moderate (positive)
Decommissioning Visual effect of removal plant and associated structures.	Medium (Positive)	Low - Medium (Kok-Moynok canyon)	Low	Minor to Moderate (positive)

7.8.9 Data limitations and uncertainty

None identified.

7.9 Traffic and transportation

7.9.1 Construction impacts

Activities during site construction phase which may lead to traffic related impacts include:

- Additional traffic on surfaced roads (EM11), including potential abnormal loads, from major highway to the laydown area near Kemin SS and Balykchy Substation leading to impact on road users and traffic flow.
- Additional traffic on local unsurfaced roads (gravel) for delivery of equipment to the tower work fronts and substation leading to an impact on the local community (in particular where the road passes through a community e.g. DEU-10 and Kok-Moynok-2 and shopping areas in Cholok, near by the Kemin SS and other road users (general)
- Increased vehicle movements on all roads leading to impact on road infrastructure condition.

7.9.1.1 Impact upon road users and traffic flow

Based on baseline data about the traffic flow between the Kemin SS and the Balykchy SS (EM11) traffic flow and movements are moderate. This road will primarily be used for transporting the major equipment to the laydown areas at the Kemin and Balykchy SS, including transportation of transformers which are considered abnormal loads. Once delivery of the key materials has been undertaken, this road will be used intermittently for day-to-day construction vehicles and access to the OHTL ROW and substation by workers. The magnitude of the impact on EM11 is considered LOW.

For day to day activity to difference sections of the line, it is assumed there would be up to three teams of 10 working sequentially along the line and their associated vehicles and vehicles for delivery of equipment, the project could add between 20 and 30 vehicle movements (predominantly HGV and vans) per day during the early stages of equipment delivery and cement works along this unsurfaced road.

Near the Kemin SS there are shopping areas shopping areas in Cholok that experience nuisance impacts from project vehicles from time to time. Along the northern section of gravel road the road is not heavily used by community members and there are few receptors. This road will be used to transport materials and equipment to the tower worksites with access at Kemin substation. The magnitude of the expected impact along this section is considered to be LOW, except in the Cholok shopping area near Kemin SS.

For the middle sections of the OHTL, access to the gravel roads for construction work will be via Kok-Moynok–2. There are 2 access points off the EM11, one where the EM11 intersects with the

EM-23 from which various gravel access roads branch towards the OHTL ROW and one which exits directly into a residential areas that is part of Kok-Moynok-2 called DEU-10. This area and another residential area to the west are shown in Figure 139 below. Consultation revealed that during previous OHTL construction works, traffic impacts related to project vehicles through these villages was highly disruptive and caused much damage to the road (recently repaired), specifically along the orange highlighted sections in the figure below. Given a relatively short-term construction period (3 to 9 months) , the overall impact magnitude is deemed to be MEDIUM.

Figure 139: Access pinch points in Kok-Moynok-2 and alternative access options to avoid the village.

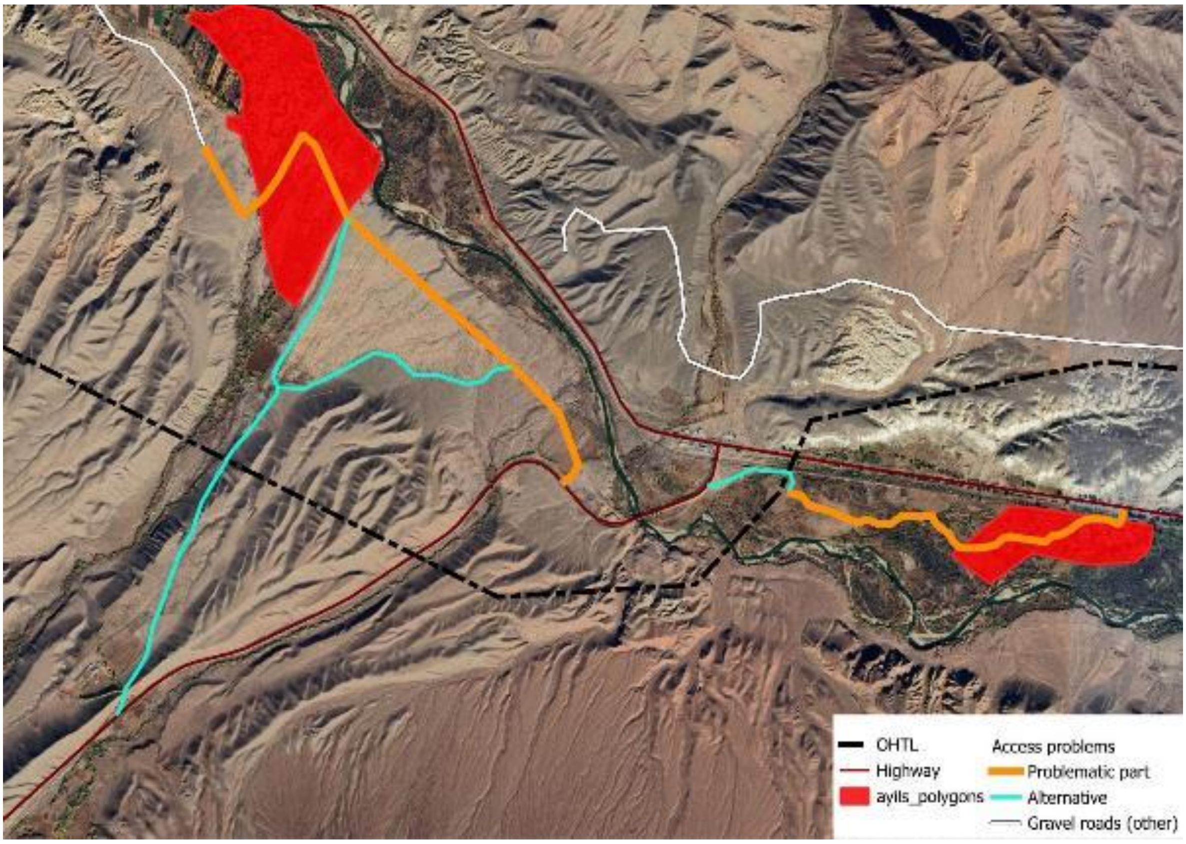


Figure 140: Example of vehicle delivering transformer

This would taper off during the steel erection and conductor stringing works and taper off even further during commissioning works.

7.9.1.1.1 Impact upon route infrastructure

The surfaced roads are not expected to be impacted from the planned increased in vehicle movements due to the short term nature of the works and the low number of abnormal loads. The magnitude of the impact, especially on these roads, is considered LOW.

It is expected there will be an impact on unsurfaced roads used for delivery of workers and equipment to the ROW, in particular in areas of concentrated activity e.g. around the village of Kok-Moynok 2, but also in other sections. The magnitude of the impact on these roads, is considered MEDIUM.

7.9.2 Operation phase

During the operational phase only very, low levels of traffic would be generated by the Project with trips relating to maintenance and upkeep of lines and substations only. Operational traffic impacts have been scoped out from further assessment.

7.9.3 Decommissioning phase

The impacts of Project decommissioning are expected to be less than or equal to that resultant from project construction and are therefore deemed to be LOW (surfaced roads) and MEDIUM (unsurfaced roads).

7.9.4 Cumulative impacts

Transportation cumulative impact could be significant if the construction programmes of neighbouring PV developments overlap. Based on the information available at this time, the PV projects and wind farm (12km distant) will not overlap with the timeline for the OHTL construction works.

7.9.5 Summary of impact magnitude

Table 99 details the impact magnitude for the impacts identified above.

Table 99: Summary of magnitude –traffic and transportation

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likeliho od	Magnitude (pre-mitigation)
Traffic along surfaced roads (EM11)	Medium	0 - 7 months (infreque nt)	Indirect AOI (M39)	Temporary during works only	High	Low

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Impact upon Road Users and Traffic Flow (gravel roads) (general sections)	Medium	0 - 7 months (infrequent)	Indirect AOI	Temporary during works only	High	Medium
Impact on road users and traffic flow (gravel roads through communities e.g. (Cholok shopping area, DEU-10, Kok-Moynok-2)	High	0 - 7 months	Indirect AOI	Temporary during works only	High	High
Impact upon Route Infrastructure	Medium	12 months	M39	Permanent	High	Medium

7.9.6 Receptor sensitivity

Receptors along the gravel road are likely to experience the greatest impact from the intermittent (large delivery vehicles) and short-term (considering the duration of the delivery phase) from traffic and transportation activities. Other PAPs are not considered to be within the direct AOI. Sensitive receptors in the AOI are summarised in Table 100 below.

Table 100: Project traffic receptors

OHTL	Sensitivity
Road users (unsurfaced roads) (northern and southern sections)	Medium
Road users (unsurfaced roads through communities e.g. Kok-Moynok–2)	High
Road users (surfaced roads)	Low

7.9.7 Mitigation, management and monitoring measures

Table 101 outlines the project specific mitigation and GIP to prevent or minimise traffic and transportation impacts for each project phase and monitoring and enhancement requirements where relevant.

Table 101: Traffic and transportation mitigation and management

Project phase	Mitigation and management measures
Design/Contracts	• Design laydown area and delivery approach to minimise vehicle movements on eastern third of the OHTL. • Define financial penalties in the contract for any project vehicles passing through Kok-Moynok-2 with money being provided directly to a fund to be given to Kok-Moynok-2 community. • Joint site inspection between the railway company (State Enterprise Kyrgyz Temir Jolu) and the Project representatives, with appropriate documentation prepared to formalize agreements for safe construction and operation at the railway crossing.
Construction - Project Specific	• No project traffic to go through Kok-Moynok-2 community "DEU-10" USE ALTERNATIVE ACCESS ROUTE FROM EM11 (main junction). • No project traffic through Kok-Moynok-2 community "west". Use alternative access route shown in blue in Figure 139. • Avoid routing project vehicles near Vehicle speed signage and other traffic control measures near the Cholok Shopping area (if it can't be avoided) • Pre-construction road condition survey (for all existing gravel roads that are proposed to be used). • Make good all roads to pre-existing condition (as determined in the pre-construction road condition survey) within 2 months of finalisation of works in that section. • Install signage at exit off EM11 directly to DEU-10 (visible from both directions) PROHIBITING Project vehicles exiting the EM11 at this point / • Install signage at the start of the "problematic" sections to Kok-Moynok-2 prohibiting project vehicles passing that way. • Ensure all contractors are aware of zero tolerance for traffic through Kok-Moynok-2 residential areas of DEU-10. • Earmark an area for parking at active work front. • Install appropriate signage to inform local communities and road users of approved ROW site access points and routes. • Prepare a ROW access map defining approved access route to each Workfront and roads where project vehicles are prohibited. • Perform a road condition assessment (gravel road) before and following the "core construction period" to assess damage/dilapidation to road infrastructure that can be attributed to project construction. • Repair damage as appropriate, i.e., "make good" within 2 months of work in section being finalised. • Run a safety campaign to improve the people's knowledge of the traffic hazard on their roads, public information and other activities to address the issues, in particular along the EM11. • Post road safety notices in roadside café's to inform road users of safe and defensive driving approaches.

Project phase	Mitigation and management measures
	• Post warning posters in roadside cafes to warn local of construction vehicles entering and exiting EM11 to the gravel roads (and using the gravel roads). • Disclose the community grievance mechanism for reporting traffic infractions by Project vehicles, in particular in Kok-Moynok-2. • Ensure all Project vehicles are clearly marked as project-related vehicles so that any infractions by drivers/companies can be easily attributed and penalties applied. • No night time driving along unsurfaced roads. • Develop an abnormal loads method statement for the delivery of transformers. • All refuelling to take place at central laydown area (not along the OHTL routes or at the work fronts). • Develop drivers code of conduct.
GIP[136]	• Enforce speed limits and reduce vehicle movements (maximum of 15 km/h) for project vehicles on unsurfaced roads. • Comply with weight limit restrictions on all roads. • Following the SEP, inform nearby dwellings and road users on the timing and duration of works along the OHTL route. • Ensure escorts, flag persons and other safety measures are employed where necessary (in particular on single track roads). • Coordinate with all necessary authorities (especially if there are any abnormal loads). • Include measures to respond to traffic incidents in the EPRP. • Evidence that all drivers can demonstrate required competencies for the vehicle they are driving and have signed a driver's code of conduct.
Operation	• Apply GIP as per construction GIP above to all O&M activity implemented through the NEGK ESMS. • No project traffic through Kok-Moynok-2 community. Use alternative access route shown in blue in Figure 139. • No project traffic to go through Kok-Moynok-2 community "DEU-10" USE ALTERNATIVE ACCESS ROUTE FROM EM11 (main junction).
Decommissioning	• Develop a decommissioning traffic and transportation plan • As per construction and project specific and construction GIIP

136 GIP for air managing air quality impacts can be referred to in https://www.rbkc.gov.uk/pdf/Document%2012%20-%20BRE%20-%20Control%20of%20Dust%20from%20Construction%20and%20Demolition%20Activities.pdf ii) IFC EHS Guidelines General

Project phase	Mitigation and management measures
Compensation/ Enhancement	• None identified.
Monitoring	• Record any traffic incidents in accordance with the incident procedure. • Review monthly stakeholder grievance related to traffic and road condition.

7.9.8 Residual Significance

Following the application of the mitigation measures outlined in Table 101, the magnitude of the impact is expected to reduce for all receptors. The residual significance post mitigation is summarised in Table 102. The assessment has indicated that traffic and transportation impact due to the construction and decommissioning phase of the OHTL would not be significant.

Table 102: Traffic and transportation residual significance

Adverse impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Construction impacts - Road infrastructure condition	Low	Medium	Low	Minor
Construction impacts on road users/ communities (unsurfaced roads) (e.g. Kok-Moynok-2)	Medium	High	Low	Moderate
Construction impacts on road users (general)	Low	Low	Low	Insignificant
Decommissioning impacts on road users/ communities (unsurfaced roads) (e.g. Kok-Moynok-2)	Low	Low	Low	Insignificant
Decommissioning impacts on road users/ communities (unsurfaced roads) (e.g.Kok-Moynok-2)	Medium	High	Low	Moderate

7.9.9 Data limitations and uncertainty

None identified.

7.10 Labour and procurement

7.10.1.1 Construction phase - Positive impacts

The total workforce is unlikely to exceed 200 workers for the construction phase. This is likely to be made up of approximately 40 unskilled local labourers and drivers and 30 skilled workers that can be sourced from the Project region. The remainder of the workers will be skilled workers that will need to be sourced from outside the region (70 workers), management and supervisors, including health and safety and the CLOs (30 workers). The composition of the workforce will consist primarily of skilled OHTL construction workers. Given the fact that there have been two OHTLs previously constructed in the area, and the Project is located near to the population hubs of Balykchy and Kemin, it is possible that people skilled in OHTL construction will be able to be identified in the local communities, however it is unlikely that sufficient skilled workers will be available in the region to fill all of the require positions. Therefore, the has been assumed, for the purpose of the assessment, that the majority of construction workers will be sourced from further afield via the Main Contractor(s).

There is potential for a small amount of unskilled or semi-skilled temporary employment generation during the construction phase that will result from the ground clearance for the ROW, construction of the foundations, drivers and security work. This type of work may be sourced from the local communities. There is also a possibility that the Project may source some of its procurement contracts from local communities as well (such as food or raw materials). The workers are also likely to frequent the shops and businesses along the EM11 highway, during construction.

Although local construction jobs and local procurement contracts will be temporary, they will be a positive impact for local communities and contribute to livelihood security. In addition, local workers and contract workers having earnings that can be spent on local goods and services, will have induced socio-economic benefits on local communities. Skills and experience gained through this small amount of temporary work experience will benefit the workers' future job prospects. Some of the AOI communities identified high numbers of unemployed people, particularly for youth and women, that could benefit from employment.

7.10.2 Construction phase - Adverse impacts

Kyrgyz Republic has ratified the eight fundamental ILO conventions and has protections in place for salaried workers (e.g., those hired by NEGK or the Main Contractor). Therefore, salaried workers are less at risk than short-term contract workers.

Day labourers and security guards are some of the more vulnerable workers on a work site as they may not have the same access to training, or representation and may feel the need to work long hours without sufficient compensation. Local workers and international migrant workers may be poorly educated or unaware of their rights in the workplace. This can impact a workers' wellbeing or their ability to seek grievance redress, if necessary.

All construction workers, and particularly local and migrant workers can be vulnerable to projects not providing adequate working conditions, some key risks can include:

- insufficient personal protective equipment (PPE);
- not providing a contract or other related documentation that clarify worker rights;
- withholding of personal documents or passports;
- lack of payment or insufficient payment (often related to overtime hours or night work);
- excessive working hours, and/or lack of breaks and rest periods; and
- unsuitable accommodation.

Migrant workers, which include the skilled workforce required for the Project, will likely need to be accommodated in nearby cities. Balykchy city has confirmed that it has available options for accommodating workers. Kemin city does not. Therefore, when works are conducted near Kemin, workers may need to travel long distances to reach their work sites. There is a risk that the accommodation provided to workers will not be suitable (for example, unsanitary, not providing sufficient facilities, or too small for the number of workers).

Given the small number of workers required for the construction of the Project, it is unlikely that private employment agencies will be used to locate workers. However, if they are used there is a risk that workers may be forced to pay recruitment fees, which would reduce the benefit the individual receives from gaining employment and may put the worker in a vulnerable position.

Kyrgyz Republic has a record of forced and child labour (particularly in the cotton industry, with a small incidence of forced labour in construction work. However, it has ratified the ILO conventions on forced labour, minimum age and worst forms of child labour. The incidence of forced and child labour is not a high risk in this type of project which employ workers through national or international companies (child and forced labour are more likely in informal types of work). The Project will also require more skilled labour, which would not be able to be sourced from the local communities as forced labour.

Workers are also at minimal risk of human rights abuses and harassment. While most AOI communities have stated that GBV incidences have reduced, cases of GBV have been identified in the local communities. Physical violence is no longer considered prevalent, but psychological and emotional violence still exists. The small workforce and temporary nature of construction (working in one location for a short time before moving) reduces the risk of the Project will impacting GBV in local communities. However, this will need to be reviewed by the Main Contractor during construction.

Workers in the Project's supply chain may not receive the same working conditions as those on the Project site. Supply chain workers could be located in Kyrgyz Republic or in other countries and they may be more vulnerable to unsafe work sites, and without direct monitoring from Project personnel, forced and child labour may be used.

7.10.2.1 Operations phase

The operational phase is not expected to create many employment opportunities. The total workforce is not expected to exceed 25 workers. Of those jobs the majority would be skilled positions hired directly through NEGK or their O&M contractors, of which only a small number could be offered to people residing in the indirect AOI and local communities. There is a minor risk that operations workers are not provided adequate working conditions (these would generally be the same risks as listed for the construction phase, but to varying degrees).

7.10.2.2 Decommissioning phase

Labour requirements for the decommissioning phase will be similar to the construction phase.

7.10.2.3 Cumulative impacts

Direct economic opportunities from the energy projects occur to a greater extent during the construction phase when larger numbers of workers will be required in comparison to the operation phase. The total number of available employment opportunities is unlikely to overwhelm the number of unemployed people in the local communities. With various project opportunities in the same area - there are projects ongoing and planned in the vicinity of the Project, such as a solar power plant near Kemin and a uranium mine near Kok-Moynok-1 and Kok-Moynok-2 -some positive contributions to the skill base would be made.

7.10.3 Summary of impact magnitude

Table 103 details the impact magnitude for the impacts identified above.

Table 103: Summary of magnitude – Labour

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Supply chain	Medium	1 to 16 months	Indirect AOI	Reversible	Intermittent/ Medium	Medium
Job creation	Medium	1 to 16 months	Indirect AOI	Reversible	Intermittent/ Medium	Medium (beneficial)

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Increased local spending	Medium	1 to 16 months	Indirect AOI	Reversible	Intermittent/ Medium	Medium
Working conditions and wellbeing NEGK	Low	1 to 16 months	Indirect AOI	Reversible	Low	Low
Working conditions and wellbeing skilled contract workers	Medium	1 to 16 months	Indirect AOI	Reversible	Low	Low
Working conditions and wellbeing unskilled/migrant contract workers	Medium	1 to 16 months	Indirect AOI	Reversible	Intermittent/ Medium	High
Unsatisfactory/non-compliant worker accommodation	Medium	1 to 16 months	Indirect AOI	Reversible	Intermittent/ Medium	Medium
GBVH in the workplace	Medium	1 to 16 months	Indirect AOI	Reversible	Intermittent/ Medium	Low

7.10.4 Receptor sensitivity

The direct AOI for labour impacts identified for the planned works is defined as the project footprint, including the tower foundation locations, the right of way under the OHTL, the substations, the accommodation facility (if any), and all temporary work areas. The indirect AOI can be considered the communities up to 15 km from the Project site. This is where the majority of local workers will travel from. Sensitive receptors in the AOI are summarised in Table 104.

Table 104: Labour sensitive receptors

OHTL	Sensitivity
NEGK (salaried) workers (construction and operations)	Low
Contract workers (construction)	Medium
Local community members (potential for employment or procurement) (construction or operation)	High
Supply chain workers (construction)	High

7.10.5 Mitigation, management measures

Table 105 outlines GIP and feasible and cost-effective measures to prevent or minimise labour impacts.

Table 105: Labour mitigation and management

Project phase	Mitigation and management measures
Design/Contracts	• Lead contractor and Tier 2 sub-contractors to demonstrate functioning HR policy aligned with ILO core conventions as well as Kyrgyz law in contractor contracts. • Define organisation requirements for the construction and operation phase for the developer and the contractor(s), including the number of E&S personnel and their qualifications. • Contractor ESMS and C-ESMP prepared and accepted by NEGK or the Main Contractor. • Perform supply chain due diligence/obtain the third-party supply chain due diligence reports to verity potential suppliers' credentials regarding the occurrence of forced labour child labour or occupational health and safety failures.
Project Specific	• Identify villages that will be considered 'local' for the purpose of local hiring (suggested villages up to 15 km from the Project ROW). • Discuss with ayil okmotus and local community the employment and procurement contracts available, in order to manage expectations (as there will not be a lot of jobs available). • Prioritize employment of community members where possible. • Prioritize procurement of goods from local communities where possible.
Good International Practice	• Prepare HR policy for the Project that meets EBRD and ILO requirements and specifically, sets a minimum age for working on the Project, prohibits the use of child and forced labour and encourages non-discrimination. • Require all contractors to submit for review their own HR Policies or to adhere to the Project's HR policy. • Prepare a policy on prioritising local employment. • Refrain from hiring day labourers. • Require all workers to sign a "code of conduct – workers". • All contractors and their subcontractors to adhere to a "labour management plan" which sets out requirements for contractors, including disciplinary actions. • Prepare an accommodation plan. • Provide worker accommodation in line with the EBRD and IFC Guidance on worker accommodation. • Set up a training plan for all workers, including inductions and regular refresher training.

Project phase	Mitigation and management measures
	• Prepare a worker grievance mechanism that involves an appropriate level of management, and addresses concerns promptly, using an understandable and transparent process that provides timely feedback without retribution. It will allow for anonymous complaints and will not impede access to other judicial remedies (it should also include requirements for GBV grievances). • Disseminate and train workers in the worker grievance mechanism. • Train Project management and workers in GBV, what it is, how to identify it, preventative measures, and how to report cases. Perform a tier 1 supply chain due diligence/obtain the third-party supply chain due diligence reports to verity potential suppliers' credentials regarding the occurrence of forced labour child labour or occupational health and safety failure.
Operation	• Demonstrate functioning HR policy aligned with ILO core conventions as well as Kyrgyz law in contractor contracts. • Implement Worker grievance mechanism
Enhancement	• Prepare a local recruitment plan to encourage employment of workers from communities within 15 km of the project and the employment of women.
Monitoring	• Report numbers of local workers and provide gender-disaggregated workforce numbers in construction and operations monitoring reports. • Perform labour auditing during construction (monthly) and operations (annually) to identify any gaps in payment, provision of personal protective equipment and/or any other concerns regarding human resources. Include a focus on vulnerable employees. • Audit the worker accommodation to ensure it meets the required standards. • Monitor the project's impact on GBV. • Monitor private employment agencies (if used) for recruitment fees and ensure they are paid by employers rather than prospective job applicants.

7.10.6 Residual significance

Following the application of the mitigation measures outlined in Table 105, the magnitude of the labour impacts is expected to reduce. The resultant impact magnitude and residual significance post mitigation is summarised in Table 106. The assessment has indicated that labour impacts will not be significant.

Table 106: Labour residual significance

Impact	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Local job creation	Medium	Medium	Medium	Moderate (positive)
Local Procurement and spending	Medium	Medium	Medium	Moderate (positive)
Working conditions and wellbeing – NEGK workers	Low	Low	Low	Neutral
Working conditions and wellbeing skilled contract workers	Low	Medium	Low	Minor
Working conditions and wellbeing – local workers	Low	High	Low	Moderate
Working conditions and wellbeing unskilled/migrant contract workers	Medium	High	Low	Moderate
Unsatisfactory/non-compliant worker accommodation	Medium	High	Low	Moderate
GBVH in the workplace	Low	High	Low	Moderate
Working conditions and wellbeing – supply chain workers	Medium	High	Low	Moderate

7.10.7 Data limitations and uncertainty

It is not currently known where the Main Contractor will wish to accommodate workers. Therefore, it has been assumed they will be housed in local communities.

It has been assumed that the majority of skilled workers will be hired from outside the Project AOI, although there may be some people with relevant skills in the local communities, given the previous construction of OHTLs in the area.

7.11 Occupational Health and Safety

7.11.1 Construction phase

Construction related OHS risks include the following[137]:

- working at heights;
- lifting operations;
- fire;
- electrocution;
- induced voltage at worksite;
- general construction site risks including exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; work in confined spaces; exposure to chemicals and hazardous materials; and exposure to electrical hazards from the use of tools and machinery;
- EMF;
- emergency and abnormal situations;

Project/location specific OHS risks to workers include;

- interface risk at substation for completion of Project end-user works;
- extreme temperatures;
- dust storms and other climate related events;
- traffic and traffic accidents;
- working in areas where there are wild animals and grazing animals.

The majority of the workforce will be skilled workers, experienced in similar projects. However occupational health and safety (OHS) risks remain, particularly in relation to working from heights, working with electricity and traffic and traffic accidents. The Project site is located on a main highway, however the nearby villages are small and ill-equipped to deal with major accidents or incidents. In the event of an accident on the site, the injured party will likely need to be transported to the cities at either end of the OHTL alignment (Kemin or Balykchy). Depending on the severity of the injury, the hospital in Kemin may not be sufficiently equipped.

Skilled workers are less likely to have OHS impacts as they are already aware of the risks on OHTL projects. However local workers may not have worked on a construction site previously and will be at a higher risk of accident or incident.

137 IFC's EHS Guidelines for Electric Power Transmission and Distribution sector specific OHS requirements.

At this stage it is not expected that temporary worker camps will be used. However, large groups of workers housed together in one hotel or guesthouse, could expose worker to the risk of illness. Contractors will be required to produce a Workers' Accommodation Plan that addresses: sleeping areas; sanitary and toilet facilities; canteen, cooking and laundry facilities, standards for nutrition and food safety, medical facilities, and leisure, social and telecommunication facilities. The accommodation plan needs to ensure that someone is checking the accommodation prior to workers being housed, and regularly during the construction period. Workers will not be charged for accommodation and related services.

The Kyrgyz Republic is prone to natural hazards, including droughts, floods, and earthquakes. Potential emergency conditions can arise as a result of the following activities:

- landslides and mudslides;
- extreme cold;
- earthquakes.

7.11.2 Operations phase

During the operations phase, workers will undertake operations and maintenance works at along the OHTL and at the substations in accordance with NEGK's H&S management policies, plans and procedures. The alignment of the PJSK NEGK H&S management systems with international GIP is not understood and therefore the magnitude of the impact is not currently known.

Occupational health and safety during operations will be primarily in relation to working at heights, working with electricity and working in mountainous conditions. As with the construction phase, should an accident occur, it will could take time to reach medical help.

7.11.3 Decommissioning phase

Decommissioning phase impacts will be similar to the construction phase risk and impacts.

7.11.4 Cumulative impacts

No cumulative impacts are expected for OHS.

7.11.5 Receptor sensitivity

Worker sensitivity is summarised in Table 107.

Table 107: Worker H&S sensitivity

OHTL	Sensitivity
Construction workers (all)	Medium
NEGK (operation)	Medium

7.11.6 Mitigation, management measures

Table 108 outlines GIP and feasible and cost-effective measures to prevent or minimise community impacts.

Table 108: Worker health and safety mitigation and management

Project phase	Mitigation and management measures
Design/Contract	• Incorporate GIP engineering controls in Project design (clearances, loadings). • Incorporate measures to reduce the risk of these hazards impacting the Project as per national codes and norms and international standard specifications. • Require the Main Contractor to be certified to ISO45001 (or equivalent). • Specify safety signage on all towers following GIP electrical specifications and codes of practice. • All towers to have security features to prohibit climbing or other interference.
Project Specific	• Establish a comprehensive Construction HSMS and OHS Plan (OHTL) and separate plans for each end-user works. • Establish a comprehensive Decommissioning HSMS and OHS Plan • Contractor to hire H&S Manager and officers (1:50 for construction workforce). • Establish and accommodation strategy and relevant plan aligned with GIP. • Review NEGK operational HSMS to identify gaps to align with GIP (e.g., ISO45001) for implementation prior to COD. • Conduct Project specific risk assessment identifying physical chemical, biological and other hazards and prioritising hazard elimination, hazard control and hazard minimisation. • Develop a Project specific Emergency Preparedness and Response Plan (EPRP) (incorporating risk management protocols for climate related risks, natural disaster risks, traffic risks, response to traffic accidents etc). • Develop a medical evacuation procedure to enable injured workers to access appropriate emergency facilities. Check access and arrival times of ambulances and other emergency services. • Ensure medical preparedness includes paramedic, first aid equipment and first aiders. • NEGK to employ / assign EHS officer to oversee E&S obligations for

Project phase	Mitigation and management measures
	the site (may be based elsewhere).
Good International Practice	• Workers to receive correct personal protective equipment (PPE). • Provide worker welfare and shelter provisions at each work front. • Workers must receive appropriate training, prior to commencement of work (site induction) • Workers must receive ongoing training through toolbox talks, oriented by training plans. Including safe driver training. • Hold mock drills (based on scenarios in the ERPP). • Ensure first aid equipment at all work fronts. • Establish an accident and incident reporting procedure.
Operation	• Establish a comprehensive operational HSMS and OHS Plan (OHTL)
Enhancement	• None identified.
Monitoring	• Daily H&S inspections by qualified personnel. • Construction and operations auditing, inspection and reporting schedule.

For general measures to address these hazards, it is possible to refer to the WBG General EHS Guidelines.

7.12 Community health, safety and security

7.12.1 Construction phase

The nearest communities to the Project are mostly located along the EM11 highway not along the RoW itself. This reduces the risk that there will be significant issues with community members entering the direct AOI. Increased vehicle movements may pose a hazard to local community members and EM11 users, as road accidents are prevalent in this area. Particularly during the tourist season.

Road users on the EM11 highway may be vulnerable to safety risks from increased construction traffic and other safety issues or construction nuisance (such as traffic slowdowns, dust and noise). Other communities along the transportation route may also be identified as at risk for transportation impacts.

Local herders use the Project right of way, so there is the possibility that site clearance works, and road construction may impact herders or their animals in and around the Project construction sites. Local community members have raised concerns that there was a boy injured during the construction of one of the previously constructed OHTLs near the ROW.

Temporary labour influx of people (either for work, or with the hope to obtain work) can cause strains on local infrastructure, such as health clinics, hospitals, markets and schools. Health clinics in particular are not well equipped, to deal with incidents that may arise during the construction and operation of the OHTL. It can also put community members at risk of conflict with workers or at greater risk of contracting communicable diseases. The location of worker accommodation is currently unknown. It is expected to be in one of the large towns at either end of the OHTL. Security guards are often the first point of contact between community members and the Project; therefore, they are the most vulnerable to conflict or harassment.

Location of worker accommodation in tourist areas, or construction nuisance caused by the Project, could cause negative impacts to the number of tourists that visit the AOI. This could reduce incomes of the local businesses that earn up to three times a much during the tourist season.

Some levels of GBV have been identified in the local communities (predominantly psychological and emotional violence, rather than physical violence). The introduction of workers in the vicinity of local communities has the possibility of increasing GBV between workers and community members. There is also the potential that women who gain employment during the construction phase, change the dynamics in their relationships, which could result in male family members resorting to GBV to right perceived imbalances.

Transit routes, such as EM11 with large numbers of transient visitors (tourists, truck drivers, etc), can lead to an increase of at-risk behaviours, such as drug use and sex work. Groups of expatriate, predominantly male workers could exacerbate or increase the amount of at-risk behaviour that in the AOI.

There will be some groups within the local communities that will be more vulnerable to risks than others, or they may have difficulties in receiving Project benefits. These include women, disabled, elderly, illiterate and youth.

7.12.2 Operations phase

Community members, could be negatively impacted during the operations phase if they attempt to access the Project infrastructure. This is unlikely as, community members have seen OHTLs before.

7.12.3 Decommissioning phase

CHSS impacts for the decommissioning phase will be similar to the construction phase.

7.12.4 Cumulative impacts

There is a solar power plant under construction near to the Kemin SS. The exact schedule for construction of this facility is unknown, however if the works occur at the same time as the Project construction work on the OHTL, this may present a possible cumulative CHSS risk.

Construction works at the Kemin SS 500 kV may also overlap, therefore cumulative impacts related to the increased size of the workforce, or construction nuisance may occur.

7.12.5 Summary of impact magnitude

Table 109 details the impact magnitude for the impacts identified above.

Table 109: Summary of magnitude – community health and safety and security

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Safety risks for community members, farmers and herders within 15km of the Project and herders	Medium	12 months	Direct AOI	Temporary during works only	Medium	Medium
Labour influx	Medium	12 months	Direct AOI	Temporary during works only	Low	Low
Poor worker conduct (inc. GBVH)	Medium	12 months	Direct AOI	Temporary during works only	Low	Low
Tourism impacts (construction [138])	Medium	12 months	Direct AOI	Temporary during works only	Low	Medium

7.12.6 Receptor sensitivity

The direct AOI for community health, safety and security impacts identified for the planned works is defined as the project footprint, including the tower foundation locations, the right of way under the OHTL, the substations, the accommodation facilities (likely a hotel or guest house), and all temporary work areas. The indirect AOI can be considered to be the local communities within 15km of the Project RoW. The socio-economic baseline provides a detailed overview of the

138 Operational impacts to tourists and tourism are addressed in section 7.8.

characteristics of the communities in the direct and indirect AOI. Sensitive receptors in the AOI and their vulnerability to CHSS impacts are summarised in Table 110.

Table 110: CHSS receptor sensitivity

OHTL	Sensitivity
Vulnerable groups (e.g., women, disabled, elderly, illiterate and youth)	Medium-High
Members of the local communities within 15KM of the RoW	Medium
Owners and workers of shops and businesses along the EM11 highway	Medium
EM11 highway road users	Medium
Herders and their employees	Medium
Project workforce	Medium

7.12.7 Mitigation, management measures

Table 111 outlines GIP and feasible and cost-effective measures to prevent or minimise community impacts.

Table 111: CHSS mitigation and management

Project phase	Mitigation and management measures
Design/Contract	• Incorporate safety requirements into the project design. • Where necessary include fencing, safety signage (in locally used languages) and other relevant features to deter community members from entering the site and/or climbing the OHTL towers. • Avoid or minimize routing the Project through touristic areas, where possible. • Plan to reach peak construction during the touristic off-season.
Project Specific	• The Project must follow relevant national legislation recommendations. • House workers from outside the project area or municipality in accommodation away from touristic locations, and in designated areas of the city, thereby reducing potential social tensions. • Prepare a GBVH plan/strategy to guard workers and community

Project phase	Mitigation and management measures
	members against sexual exploitation, GBV and contracting communicable diseases, including GBVH grievance mechanism. • Prepare a transportation plan that covers transportation of Project components as well as transportation of workers. It should include a disclosure plan for community members, should any communities be identified as vulnerable to Project impacts along the transportation route. • Provide defensive driver training, or safe driver training for workers, including what to do in the case of a traffic accident. • Employ local security guards where possible.
Good International Practice	• Undertake a comprehensive stakeholder engagement campaign to inform community members of the possible risks and impacts of the construction of the Project (refer to SEP). • Require all workers to sign a "code of conduct – workers". • Require all security personnel to sign a "code of conduct – security personnel". • Prepare an occupational health and safety plan for each phase of the project that is Project-specific and covers requirements for all key risks in the construction of OHTLs. • Prepare a security plan that outlines the security requirements for construction and operations (including numbers of guards, whether they will be armed, use of video technology, training and background checks for guards etc). • Prepare an emergency preparedness and response plan, particularly including access to medical facilities and traffic accidents. • Provide training to workers and community members (as relevant), on communicable diseases and the risks related to at-risk behaviours. • Implement and disclose details of a community grievance mechanism, which should include GBV requirements.
Operation	• Nominate CLO for operations phase and implement operations SEP.
Enhancement	• None identified.
Monitoring	• Maintain worker health and safety statistics during the construction and operations phases.

Project phase	Mitigation and management measures
	• Undertake OHS and emergency drills throughout construction and operations.

7.12.8 Residual significance

Following the application of the mitigation measures outlined in Table 111, the magnitude of the adverse community impacts is expected to reduce. The residual significance post mitigation is summarised in Table 112. The assessment has indicated that community impacts will not be significant.

Table 112: Community health, safety and security residual significance

Impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post-mitigation)	Residual significance (post mitigation)
Safety risks for members of the communities within 15km of the Project and herders	Medium	Medium	Low	Minor
Labour influx	Low	Medium	Low	Minor
Poor worker conduct (inc., GBV – at-risk behaviour)	Low	Medium	Low	Minor
Tourism impacts (C/O/D)	Medium	Medium	Low	Minor

7.12.9 Data limitations and uncertainty

None identified.

7.13 Land

7.13.1 Construction phase

The Project will need to get servitude rights over the land for the OTHL. The footprint of the OHTL towers will cause permanent impact for the lifetime of the Project (however it will be a small impact). In addition, site clearance for the OHTL ROW, access roads and temporary laydown areas/camps has the potential to impact access to grazing land. Temporary land take will be localised and focussed at work fronts at the tower locations along the route.

The owner of the land rights of the Project AOI include the government, private land owners and the Forestry Department. Local municipalities (until recently previously pasture committees) manage the temporary allocation of land for grazing. This is completed under a contract for between 1-3 years and is negotiated individually between the municipality and the herder. In addition, there are area used by communities, where animals are grazed on a rotational basis.

The RoW will also impact access routes to herding grounds. However, this is expected to be temporary, only while construction is underway in that particular area.

The Project will impact a minor percentage of the land that is being used by herders and communities. Disturbance at each tower footprint is short-term (approximately two to three weeks during tower foundation works and steel erection) and one to two weeks during conductor stringing).

Some land users have grown apricot and apple trees that may be impacted by the RoW. If these trees exceed the safety clearance, they will need to be removed from the ROW. These trees are for personal use, not for profit.

The consultation process also revealed a group of PAPs (24 persons) (part of Kok-Moynok-2 village, located in a separate area approximately 3.3 km east of the main village territory in a community identified as DEU-10) who may informally use a piece of land new Chu river for haymaking within the project's RoW (refer to Figure 143). Consultation revealed that between 1 May and 15 October, grazing is prohibited, as vegetation needs to recover; however, haymaking is permitted. In the other part of the year, the PAPs graze cows on this meadow, even in winter.

Figure 141: Meadow shared by PAPs from DEU-10

Figure 142: Meadow shared by PAPs from DEU-10

Figure 143: Field use by PAPs for cropping and grazing

The DEU-10 community land users and herders that graze animals under sections of the ROW may experience some impacts as their grazing land overlaps the Project footprint; possibly resulting in a reduced area to graze animals/ grow crops, which could ultimately result in a reduction of livelihood (due to the herders /croppers being able to graze as many animals, grow as much hay, or if the animals are not as healthy as prior to the Project, due to reduced grazing areas, dust etc.).

The Project crosses some forestry land. However, it has been confirmed with the Forestry Department, that the Project will not negatively impact these lands.

A small amount of use of medicinal plants was identified from households in Kok-Moynok 1, no other ecosystem services or other untitled land use has been identified to date. However, this may be identified once the Project design has been finalized.

7.13.2 Operations phase

During operation the project footprint will reduce to the tower foundation area only and the access tracks to the right of way. No livelihood issues are anticipated during this phase.

7.13.3 Decommissioning phase

During decommissioning, impacts will be similar to the construction phase as a result of the dismantling of Project infrastructure. Once all infrastructure has been removed, areas of permanent land take will be restored to their original state and returned to general grazing offering resulting in receptors having the original amount of available land.

7.13.4 Cumulative impacts

No cumulative impacts are expected for OHS.

7.13.5 Receptor sensitivity

The AOI for potential land acquisition and involuntary resettlement impacts identified for the planned works is defined as the Project footprint, including the tower foundation locations, substation location, access road ROW, the right of way under the OHTL, and all temporary work areas (laydown or roads). Land acquisition impacts will be identified during the pre-construction phase, as land acquisition activities should be completed prior to commencement of construction. However, impacts on loss of vegetation and trees in the right of way and restriction of access to areas could be long lasting or permanent. Positive impacts of livelihood restoration activities may last throughout the construction phase. Sensitive receptors in the AOI are summarised in Table 113.

Table 113: Land receptor sensitivity

OHTL	Sensitivity
Local communities	Low
Privately owned farms	Medium
Businesses along the EM11 highway	Low
Tourism businesses	Low
Sharecroppers	High
Herders and employees	High
Water stations	Medium

7.13.6 Mitigation, management measures

Table 114 outlines GIP and feasible and cost-effective measures to prevent or minimise land acquisition and involuntary resettlement impacts.

Table 114: Land mitigation and management

Project phase	Mitigation and management measures
Design/Contract	• As far as possible/practical undertake Project design to avoid all structures (including fish farms and animal pens), crops and trees. • Prepare a Land Acquisition and Livelihood Restoration Framework (LARF) that defines the responsibilities of the Project in relation to land acquisition and resettlement (see Volume VI). • Prepare a Livelihood Restoration Plan (LRP) based on the LARF once all designs and funding requirements are completed. • Complete all land acquisition and resettlement requirements per the Livelihood Restoration Plan (LRP) prior to the commencement of construction.
Construction - Project Specific	• Confirm with herders if there is sufficient area to graze their animals away from the Project construction works. • Confirm with croppers if there is sufficient area to continue haymaking. • Coordinate with the community of DEU-10 on the construction period, when this field is not used for pasturing nor for haymaking • Confirm that construction will not restrict access to grazing/cropping areas. • Confirm any possible employment impacts to herder employees. • Confirm potential livelihood impacts to tourism companies and local businesses.
GIP	• Include awareness campaigns for herders, private farm owners, business owners and local community members and as per Project SEP. • Design grievance mechanism to be implemented and disseminate in a culturally appropriate way to all affected persons. • Where possible time the peak construction of the Project so that it does not coincide with key tourism periods.
Operation	• Maintain community (PAPs) grievance mechanism • Monitor close out of any ongoing LARF requirements (where applicable)
Enhancement	• Undertake livelihood restoration activities with all impacted households. • Consider options for making temporary access roads useable for

Project phase	Mitigation and management measures
	community members long term (once temporary access road needs are defined) • Undertake a social development program, with affected communities.
Monitoring	• Monitor impacted households and businesses for at least three years to ensure they have at least returned to their previous level of livelihood, if not improved their livelihood. • Monitor the implementation of livelihood restoration activities. • Prepare a land acquisition and resettlement execution report to prove that involuntary resettlement has been completed as per the LRP (before construction commences).

7.13.7 Residual significance

Following the application of the mitigation measures outlined in Table 114, the magnitude of the land acquisition impacts is expected to reduce. The residual significance post mitigation is summarised in Table 115. The assessment has indicated that land impacts to be completed prior to the construction phase would not be significant.

Table 115: Land residual significance

Impact	Sensitivity	Magnitude	Residual significance (post mitigation)
Loss of Livelihood due to land take – privately owned farms (C/O)	Medium	Low	Minor
Loss of Livelihood – herders and employees (C/O)	High	Low	Moderate
Loss of Livelihood – businesses (C/O)	Low	Low	Neutral
Loss of ecosystem services	Low	Low	Neutral
Loss of income from tourism	Low	Low	Neutral

7.13.8 Data limitations and uncertainty

None identified.

7.14 Biodiversity

7.14.1 Construction phase

The construction, operation, and decommissioning of the subject OHTL may generate several impacts on various sensitive biodiversity receptors, notably a total of thirty-three species or species groups that have been defined as Priority Biodiversity Features, following the definitions and criteria for such in EBRD PR6.

The Project has the potential to generate the following types of impacts on sensitive biodiversity receptors:

- Introduction of invasive species;
- Habitat loss and degradation;
- Loss of sensitive plant species;
- Disturbance to, and displacement of animals;
- Injury/death of terrestrial (non-flying) animals;
- Bird collisions with powerlines;
- Bird electrocutions on powerline pylons/towers;

Indirect impacts on fish species through deposition of pollutants or sediment, or direct disruption of river or riverbank habitats

The OHTL does not pass through any legally protected areas (LPA) or Internationally Recognized Areas (IRA, including Key Biodiversity Areas, KBA). The nearest such areas are:

- Western Lake Issyk-Kul Important Bird Area (IBA/KBA), 1 km from the OHTL
- Issyk-Kul Lake State Nature Reserve, and UNESCO Man and the Biosphere (MAB) Reserve, 6.8 km from the OHTL.

No impacts from construction, operation, or decommissioning will occur on any LPA or IRA. Impacts on these areas are not considered further.

7.14.1.1 Habitats and Flora

Habitat/vegetation loss and degradation. Habitat mapping along the OHTL route indicates that the OHTL passes through a wide variety of natural and anthropogenic habitat types, as follows (following the IUCN habitat classification scheme):

- Anthropogenic habitats
  - Urban areas
  - Agricultural land
  - Rangeland (montane hay meadows)
- Natural habitat types
  - Rocky outcrop shrubland
  - Stony foothill arid steppe

- Montane steppe grasslands
- Alpine shrubland
- Montane xerophytic shrubland
- Scree slopes
- Red sandstone desert grassland
- Red sandstone desert shrubland
- Riparian forest
- Water body (river)
- Bare canyon cliff

Most of the natural habitat types listed above are all relatively widespread habitat/vegetation types within the region, though rivers and riparian forests represent examples of natural habitat types with more limited distributions. Within the Project area, most of the habitat/vegetation is in a relatively natural condition, with a low-moderate degree of anthropogenic impact from low-density livestock grazing activities that occur on a seasonal basis throughout most of the area, as well as limited zones of heavy anthropogenic impact from small human settlements, areas with heavy livestock grazing pressure, and hay meadows and other agricultural habitats. Direct habitat loss and degradation impacts are expected to occur exclusively within the Project's construction and decommissioning phases, through the removal of existing vegetation and disturbance of existing soil/substrate by heavy machinery. Considering the proposed stringing technique, no habitat disturbance along the OHTL ROW is expected except within the area required for tower footprints and access roads. Temporary habitat loss/degradation impacts are expected to occur in a somewhat larger footprint containing any areas that may be used as laydown or staging areas during Project construction and decommissioning, restricted to these phases of the Project's life cycle. The pre-mitigation magnitude of impact on natural vegetation communities is considered MEDIUM.

Direct impacts to sensitive plant species. Six plant species with protected status are classified as PBF for the Project, subject to a "no net loss" mitigation standard, of which three species were documented within the Project area during baseline studies, which sampled floristic communities in a series of 72 10 x 10 m sampling plots located along, and within 500m of the OHTL route. Additional locations of the three detected species, presence of the other four non-detected species, or additional sensitive plant species qualifying as PBF and warranting protection could occur, and may be discovered over the course of pre-construction surveys. It is considered that individuals of any sensitive plant species can be relocated prior to works commencing if discovered in the direct footprint of a tower or access road during pre-construction surveys. The pre-mitigation magnitude of impact on sensitive plant species is considered MEDIUM.

Accidental introduction of invasive species. The presence of humans, vehicles, and heavy machinery within the Project area may result in the accidental introduction of invasive species. This impact could occur throughout the Project's life cycle, as a function of the level of human and vehicular traffic, though concentrated within the construction and decommissioning phases. Only 3 alien plant species were identified in the baseline surveys, among over 300 total plant taxa identified, and none of these were detected in more than two of the 72 total botanical sample plots, indicating that very few alien species occur in the area, and none are very widespread. The magnitude of this impact is deemed to be LOW given the relative scarcity of invasive species at this time, and the relative insensitivity of central Asian desert/steppe environments to this type of impact.

7.14.1.2 Terrestrial Fauna and Avifauna

Based on the distribution of species in the baseline section, the receptors most at risk of disturbance and habitat loss/degradation impacts include several sensitive species of small terrestrial vertebrates, as well as several sensitive raptor and vulture species that nest within the area.

The only reptile or amphibian identified as a PBF for the Project is the Asian Frog *Rana asiatica*. It was not detected in the area during the baseline surveys, but it is considered possible that it could occur there, particularly in proximity to small water bodies and patches of woodland located along the riparian corridors of the Chu River and major tributaries (Konorchok, Kok-Moynok Rivers) through which the OHTL passes.

Only two species of mammal have been classified as PBF for the Project, and neither one was documented in the area during the baseline survey (Marbled Polecat, Snow Leopard), indicating that these species are rare in the Project area, if they occur at all.

Sensitive species of raptors and vultures that nest within the area include Golden Eagle *Aquilla chrysaetos* and Himalayan Griffon *Gyps himalayensis*. No other bird species classified as PBF are considered potentially sensitive to disturbance and/or habitat loss/degradation impacts during the Project's construction phase.

All of the sensitive species of terrestrial (non-flying) animals identified as PBFs, plus sensitive species of locally nesting raptors and vultures, may experience either injury or death (direct fatality) impacts, Habitat loss/degradation impacts, or Disturbance/displacement impacts during the Project's construction and/or decommissioning phases. The former is considered to be a function of the areal extent of an animal's habitat/vegetation that is removed either permanently (within the footprint of roads, towers, or other Project infrastructure that will persist throughout the operations phase) or temporarily (within construction laydown areas, or other temporarily disturbed areas), while the latter may extend to a broader area, depending on the sensitivity of each animal to disturbance from construction activities, which may cause certain animals to experience disruption of normal activity patterns (disturbance), or to abandon previously inhabited areas (displacement), even outside of the Project's soil disturbance footprint. The construction period at any single work front is expected to be short-term (two to three weeks) and relatively low intensity, based on the required workforce and equipment. Particular periods of note where disturbance impacts on disturbance-sensitive animals may be most significant include the following:

- Golden Eagle – (March-August)
- Himalayan Griffon– (March- August)

- Asian Frog – (April-June -)

Considering the small soil disturbance footprint of the Project, the pre-mitigation magnitude of habitat loss/degradation effects is considered to be LOW for nesting Golden Eagles, Himalayan Griffons, and all sensitive species of mammal and amphibian.

Considering the potential sensitivities of sensitive terrestrial animal species and nesting Golden Eagles and Himalayan Griffons to disturbance/displacement effects from Project construction activities, the pre-mitigation magnitude of this impact is considered to be MEDIUM for these species.

Injury or death of terrestrial animals. The Project may cause the injury or death of terrestrial (non-flying) animals during the Project's construction phase, primarily through the activities of heavy machinery, as well as vehicular traffic within the area. The Asian Frog and mammals are particularly at risk of this impact as they dwell on, or underneath the soil/substrate. Thus, soil-disturbing activities of heavy machinery may result in the death or injury of such animals. Amphibians are particularly vulnerable to injury during the hibernation period, when they are less active (or inactive) and unlikely to naturally leave the area, nor can they be relocated prior to works commencing. The pre-mitigation magnitude of the impact of injury or death to Asian Frog, Snow Leopard and Marbled Polecat is considered to be LOW, primarily because none of these species were detected during the baseline surveys, and all are likely to be rare residents of the Project area, if present at all.

7.14.1.3 Fish

Five species of fish have been identified as PBF for the Project, on the basis that they i) have sensitive status or satisfy another EBRD PBF criterion, and ii) may occur in the rivers that are crossed by the Project's OHTL in three places, including for spawning. Any of these species may be affected by indirect impacts from Project construction, if such activity were to result in either i) deposition of sediment or a pollutant into the river, or ii) disruption of the soil/substrate of the river channel or river banks by heavy machinery. Because of the wide spacing between support structures, and relatively small, narrow strips of river habitat, such impacts are generally easily avoided by siting OHTL support structures a safe distance from river channels and by implementing measures to minimize risks of accidental sediment or pollutant deposition into rivers. Nonetheless, because of the potential for such impacts, the pre-mitigation magnitude of this impact is assessed as MEDIUM.

7.14.2 Operations phase

Electrocution of birds. Certain birds may become electrocuted and experience mortality during the Project's operations phase if they make simultaneous contact either with two different electrified parts of the OHTL or with an electrified and a grounded part. This impact is generally limited to species of birds that exhibit behavioural tendencies to perch and/or nest on power line structures, such as many raptors, vultures, and owls. For the subject Project, a large number of sensitive species that may be susceptible to electrocution impacts on OHTL have been either documented to occur, or are considered likely to occur in the Project area, including Bearded, Egyptian, and Cinereous Vultures, Eurasian and Himalayan Griffons, Steppe, Imperial, Golden, and Greater Spotted Eagles, and, Saker Falcon. All of these named species have been classified as PBF for the Project.

This impact generally occurs exclusively, or primarily on powerline support structures (e.g., pylons, towers), and the intensity of this impact is highly associated with the design of such structures (i.e., the extent to which the design creates electrocution hazards, based on the proximity and location of electrified parts in relation to each other, and in relation to grounded parts). Pre-mitigation (i.e., without raptor-friendly tower/pylon designs), the magnitude of this impact is deemed HIGH for all of the bird species listed above.

Bird collisions. Certain types of birds may experience injury or death from collisions with power lines during the Project's operations phase. This type of impact is believed to occur because certain birds have difficulty seeing the cables of the OHTL while in flight, particularly during foggy conditions or at dawn/dusk, thus colliding with them if they are on the birds' flight path. For this reason, the overhead, or static wire of OHTL is generally the most hazardous for bird collisions, as it is generally the narrowest cable, and hence the least visible to a flying bird. Bird collisions may occur anywhere along the spans (line segments between pylons or towers) of the OHTL, and are generally concentrated where OHTL pass directly through, or near, water bodies, wetlands, or other habitats that are known to concentrate collision-prone bird species.

Birds' susceptibility to collisions with OHTL varies substantially across species, with the highest collision susceptibility generally associated with large-bodied bird species that possess relatively high wing-loading (the proportion of body weight to the size of the wings), as this type of flight morphology renders these species less buoyant and manoeuvrable in flight. Bird collisions with OHTL are also associated with visual capacity and flight behaviour of various bird taxa, as well as lighting and weather conditions that may affect the visibility of the cables. A large number of collision-susceptible bird species potentially occurring in the Project area were identified as PBF for the Project, and an additional PBF, consisting of a multispecies grouping of other (less sensitive) large-bodied waterbird species potentially present in the area, was also defined. However, the baseline studies indicated that no collision-prone bird species occur in high abundance within the Project area, including during migration seasons. Individual species defined as PBF for the Project that may be susceptible to OHTL collision impacts include White-headed Duck, Demoiselle and Common Cranes, Sociable Lapwing, Arctic Loon, and Great White and Dalmatian Pelicans.

In addition to these species, it is also possible for large raptors and vultures to experience OHTL collision impacts, however the susceptibility of these species is generally lower, due to better visual capabilities and lower wing-loading, which enables slower speed, more manoeuvrable flight. The collision susceptibility of these species is largely limited to certain lighting and climatic conditions, such as dusk or dawn, or fog or clouds, which render the OHTL less visible (though such birds also tend to fly less frequently under such conditions). Furthermore, collision susceptibility of raptors and vultures may be elevated where OHTL come near areas of concentrated flight activity, such as nesting, roosting, or feeding locations.

Compared with some OHTL projects in the region, there is a relatively low degree of avian collision risk along the Project's OHTL, as it comes no closer than 9.2 km to the shore of Lake Issyk-Kul, and as the diversity and abundance of collision prone birds flying along the riparian corridors closer to the Project's OHTL are relatively low.

Considering all of these factors, the pre-mitigation magnitude of this impact is deemed MEDIUM.

Disturbance to, and displacement of animals.

Although considered to be most significant during the Project construction and decommissioning phases, this type of impact may also occur to a lesser degree during the Project operation, e.g., through vehicular traffic and human activity associated with maintenance of the OHTL. Maintenance works will be infrequent, typically short duration, and involve one or two vehicles. Maintenance vehicles will be required to only use the designated access tracks and roads and to obey speed limits. The pre-mitigation magnitude of this impact is expected to be LOW for all sensitive species of animals.

Injury or death of terrestrial (non-flying) animals.

This type of impact is also considered to be most significant during Project construction and decommissioning, but may also occur to a more limited extent during Project operation, primarily as a result of vehicular traffic, which may cause animals to be injured or killed if they are run over by vehicles. Based on the relatively low level and light footprint of maintenance activities expected during the Project's operations phase, the pre-mitigation magnitude is deemed to be LOW for all terrestrial animal species.

7.14.3 Cumulative impacts

The presence of multiple transmission lines and other large-scale infrastructure activities may lead to a combined pressure on the functionality of ecosystem performance and also deforestation impacts.

7.14.4 Receptor sensitivity

Thirty-three distinct biodiversity features have been identified as Priority Biodiversity Features, potentially sensitive to impacts from the Project, based on the definitions and criteria of EBRD PR6. For the purpose of this impact assessment, these, plus several additional biodiversity features that may experience impacts from the Project, are termed "receptors", and their sensitivity is scored and presented in Figure 108.

Table 116: Potentially impacted biodiversity receptors, including all Priority Biodiversity Features (PBF) determined through the assessment performed using EBRD PR6 methodology and criteria, and presented within the biodiversity baseline section of this ESIA

Receptor	Taxon	Sensitivity	PBF/CH
Terrestrial habitat/vegetation	N/A	Low	
Malus sieversii	Plant	Medium	PBF
Amygdalus bucharica	Plant	Medium	PBF
Tulipa zenaidae	Plant	Medium	PBF
Tulipa greigii	Plant	Medium	PBF
Tulipa ostrowskiana	Plant	Medium	PBF
Chesneya villosa	Plant	Medium	PBF
Rhynchocypris dementjevi	Fish	Low	PBF
Schizothorax pseudoaksaiensis	Fish	Medium	PBF
Phoxinus issykkulensis	Fish	Low	PBF
Triplophysa labiata	Fish	Medium	PBF
Leuciscus schmidti	Fish	Medium	PBF
Asian Frog	Amphibian	Medium	PBF
White-headed Duck	Bird	High	PBF
Demoiselle Crane	Bird	Low	PBF
Common Crane	Bird	Low	PBF
Sociable Lapwing	Bird	High	PBF
Arctic Loon	Bird	High	PBF
Great White Pelican	Bird	Medium	PBF
Dalmatian Pelican	Bird	Medium	PBF
Bearded Vulture	Bird	Medium	PBF
Egyptian Vulture	Bird	High	PBF
Cinereous Vulture	Bird	Medium	PBF
Himalayan Griffon	Bird	Medium	PBF
Eurasian Griffon	Bird	Medium	PBF
Greater Spotted Eagle	Bird	High	PBF
Steppe Eagle	Bird	High	PBF
Imperial Eagle	Bird	High	PBF
Golden Eagle	Bird	Medium	PBF
Saker	Bird	High	PBF
Other migratory waterbirds	Birds	Low	PBF
Marbled Polecat	Mammal	High	PBF
Snow Leopard	Mammal	High	PBF

7.14.5 Mitigation and management measures

In order to mitigate the anticipated impacts to biodiversity, a set of mitigation measures has been identified, following the mitigation hierarchy, and based on a review and analysis of the effectiveness and feasibility of potential mitigation options. These mitigation measures are listed and described in Table 117. All mitigation defined here must be elaborated in a BMP (see Volume IV – ESMP), and the project ecologist will review and give final instructions regarding where specific mitigations might need to be implemented based on the final surveys, design, and other factors.

Table 117: Biodiversity mitigation and management

Project phase	Mitigation and management measures
Design (to be included in the Contractor RFP design specification)	OHTL Design Specification in the Contract to include the requirement to undertake the following for approval of the final design by a qualified project ecologist on behalf of NEGK: 1) Install Bird Flight Diverters on overhead, or static lines of the OHTL following GIP, within four specific segments, totalling 8.722 km in length, that have been identified as having elevated collision risk due to proximity to features that may concentrate eagle/vulture flight activity as listed below and in Figure 144 below): o Narrow sections (two) of gorges with potential nesting habitat and elevated flight traffic of eagles and vultures o Chu River crossing, with potentially elevated flight traffic of waterbirds o Portion of line in proximity to NABU wildlife rehabilitation center, to avoid proximity to collision-prone rehabilitated birds near their release site 2) use “Raptor safe” pylon designs for the entire OHTL: o electrified cables suspended below, rather than above support structures; o ≥2m of insulators at each attachment point of a powerline to a support structure; o ≥2m separation between electrified cables; o jumper cables suspended below insulators/support structures. 3) Micro-siting of towers, access road and temporary laydown areas to avoid known locations of *Malus sieversii, Tulipa zenaidae, Tulipa ostrowskiana*, and any other species of plants identified as PBF or with comparable redlist status, if discovered in preconstruction surveys, to the extent possible. 4) Micro-siting of pylons and access roads to avoid any areas within 25 m of the Chui, Konorchok, or Kok-Moynok Rivers, or riparian forest groves along the rivers.

Project phase	Mitigation and management measures
	Limit the extent of new access road that must be built along the ROW. Use existing road wherever possible (refer also to the transportation mitigation section).
Project Specific – Construction	- Prior to crossing forest land, consult with Forest Service under Ministry of Emergency, to confirm notify and agree measures to restore vegetation in the ROW if needed (based on final tower siting, access roads, laydown area etc.). Requirements to be reflected in the Project BMP. - Conduct pre-construction survey for nesting raptors and vultures within the central portion of the OHTL containing potential nesting habitat (see Figure 1209) - Avoid siting generators or noisy equipment within 500m of any active nests of PBF bird species discovered during the pre-construction raptor/vulture nest surveys. - Avoid (where possible) siting towers within 500m of any active nests of PBF bird species discovered during the preconstruction raptor/vulture nest surveys. Where this is not possible, aim to do below-ground work and tower erection at the towers within 500m of such nests outside March to May (early nesting season) to minimise disturbance impacts (noise, light etc.) - Conduct preconstruction sensitive plant survey in the areas where soil disturbance will occur during construction (pylon bases, new access roads, laydown areas) within the portion of OHTL that has been identified as having sensitive vegetation (see **Error! Reference source not found.**), to look for all species described as PBF, as well as any other rare plants with similar redlist status, that may be present in such areas. All rare plant surveys must be conducted between April 15 and May 10, which is the period when geophytes are expected to be flowering. - Implement construction phase rare plant rescue/relocation program (defined in the BMP), in consultation with national authorities and as per regulations, including topsoil/soil conservation and replanting measures. - All equipment that potentially can generate pollution (generators, hazardous material storage, heavy machinery) to be parked/stored/sited more than 25m from riverbanks

Project phase	Mitigation and management measures
	2) - Provide identification training for workers to identify the Asian Frog for avoidance
GIP	- Minimize soil/vegetation disturbance during construction and, where required, use sustainable soil/vegetation techniques. - Use only the demarcated area for laydown and access (construction and operation). - Avoid any deposition of sediment or pollutants into the rivers - Minimise use of trenches or other steep-walled excavations. - Backfill open excavations as soon as possible after construction activity. - Rehabilitate temporarily disturbed areas as soon as possible after construction activity is finished to minimise the risk of soil erosion - Worker/contractor training/awareness, supervision regarding impacts to animals, and protection of species. - Prohibit poaching and interactions with fauna and flora in the worker code of conduct. - Establish, post, and enforce vehicular speed limits and other traffic management measures. Implement good housekeeping measures for materials handling and waste management.
Operation	None noted (but see under "Monitoring"
Decommissioning	Prepare a decommissioning management plan (including management of biodiversity impacts) prior to decommissioning.
Enhancement	None noted.
Monitoring	- Monitor effectiveness of sensitive plant rescue/relocation against NNL criteria. - Implement minimum one year of bird fatality monitoring underneath entire OHTL (and see BMP)

Figure 144: Proposed sections for installation of Bird Flight Diverters (BFDs)

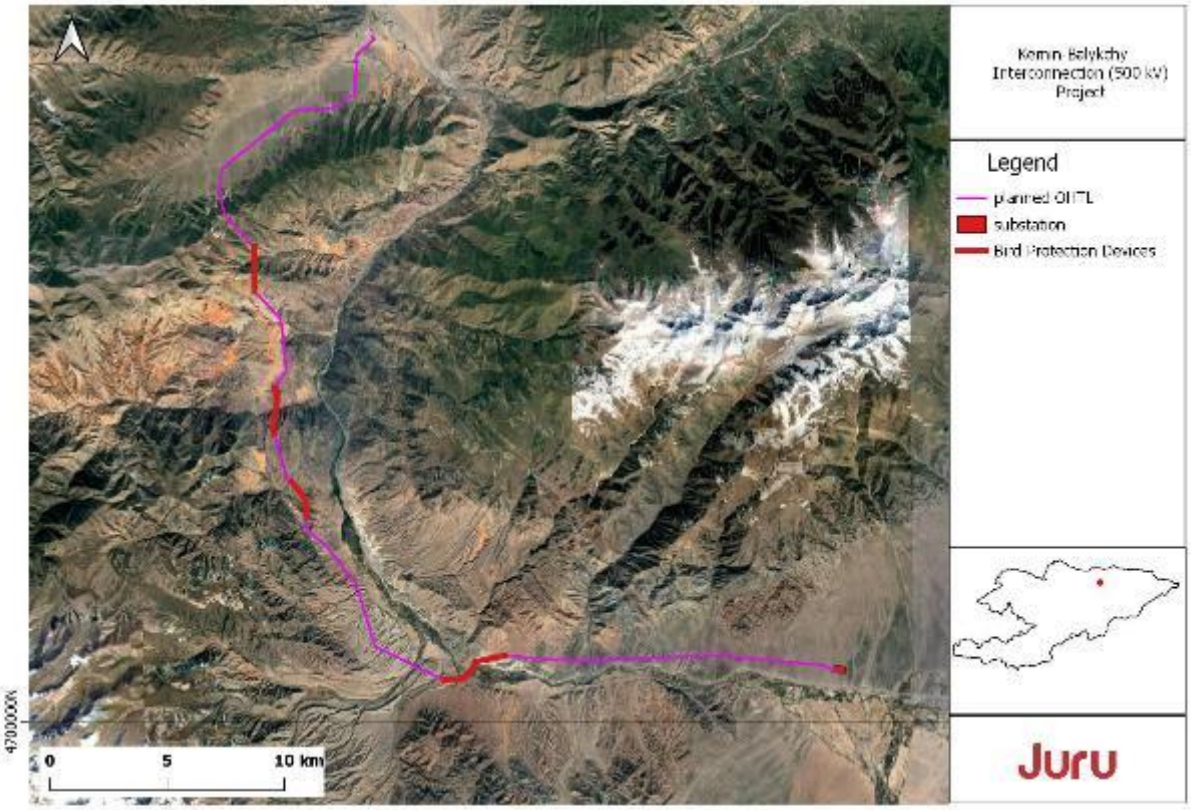
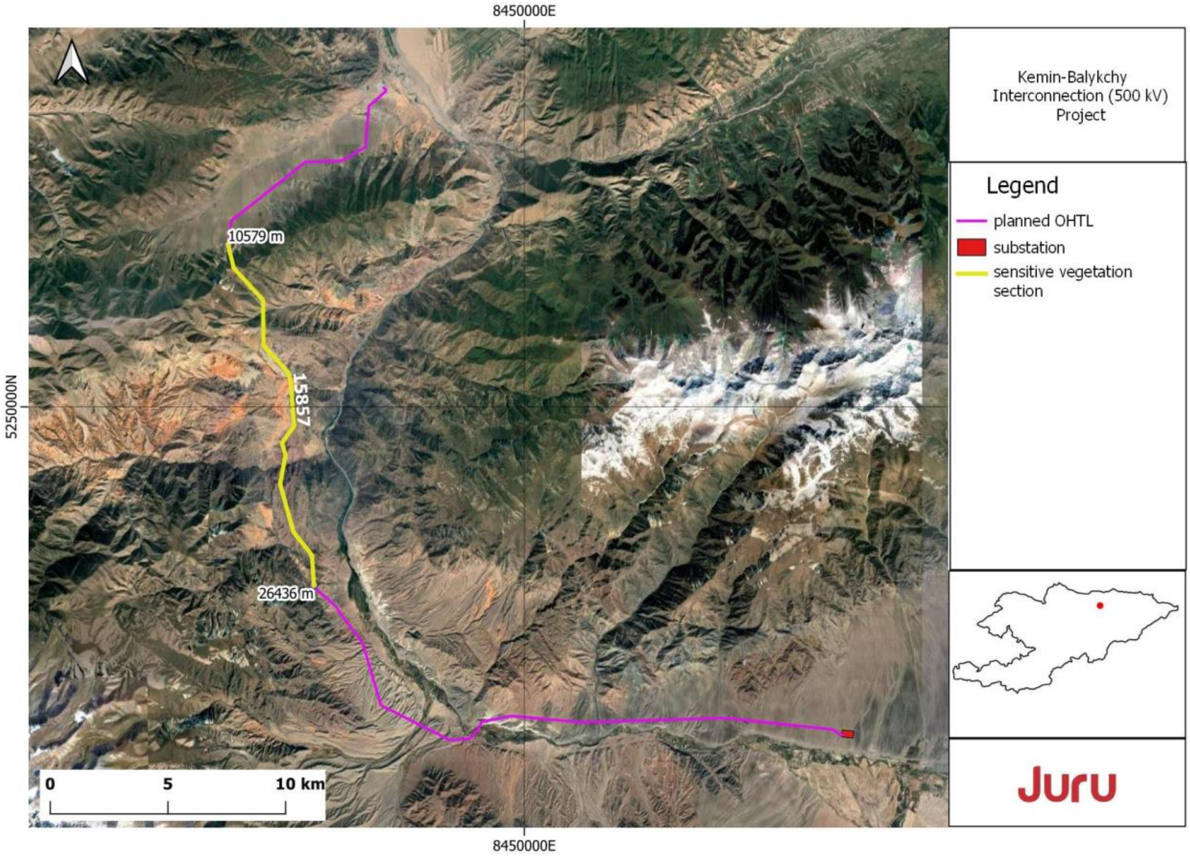

Kemin-Balykchy
Interconnection (500 kV)
Project
Legend
planned OHTL
substation
Bird Protection Devices
0
5
10 km
4700000N

Figure 145: Sensitive vegetation portion of OHTL (yellow segment), in which pre-construction rare plant survey is to be performed in all areas where soil disturbance will occur during construction



7.14.6 Residual significance

Table 118 presents the residual significance assessed for each adverse biodiversity impact anticipated for the Project, where the set of individual impacts is defined as all of the distinct types of impacts described earlier, broken out separately for different receptors of that impact, grouped by sensitivity level. Impact magnitude and residual significance are considered in a post-mitigation (residual) context, assuming implementation of the mitigation measures described in the previous section. Receptor sensitivity and impact magnitude and residual significance are scored according to the impact assessment methodological rubric.

Table 118: Biodiversity residual significance

Adverse Impact	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
	Construction/Decommissioning works)			
Habitat loss/degradation – natural vegetation communities	Medium	Low	Low	Neutral
Direct loss – PBF plant species	Medium	Medium	Low	Minor

Adverse Impact	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Introduction of invasive species, impact on natural vegetation communities	Low	Low	Low	Neutral
Habitat loss/degradation – high sensitivity terrestrial vertebrates and birds	Medium	High	Low	Moderate
Habitat loss/degradation – medium sensitivity terrestrial vertebrates and birds	Low	Medium	Low	Minor
Habitat loss/degradation – low sensitivity terrestrial vertebrates and birds	Low	Low	Low	Neutral
Indirect impacts on medium sensitivity fish	Medium	Medium	Low	Minor
Indirect impacts on low sensitivity fish	Medium	Low	Low	Neutral
Disturbance/Displacement – high sensitivity terrestrial vertebrates and birds	Low	High	Low	Moderate
Disturbance/Displacement – medium sensitivity terrestrial vertebrates and birds, including nesting Golden Eagles and Himalayan Griffons	Low	Medium	Low	Minor
Disturbance/Displacement – low sensitivity terrestrial vertebrates and birds	Low	Low	Low	Neutral
Injury/death – high sensitivity terrestrial vertebrates and birds	Low	High	Low	Moderate
Injury/death – medium sensitivity terrestrial vertebrates and birds	Low	Medium	Low	Minor
Injury/death – low sensitivity terrestrial vertebrates	Low	Low	Low	Neutral
	Operation			
Electrocution – high sensitivity electrocution-prone birds (Egyptian Vulture, Greater Spotted Eagle, Steppe Eagle, Imperial Eagle, Saker Falcon)	High	High	Low	Moderate
Electrocution – medium sensitivity electrocution-prone birds (Bearded and Cinereous Vultures, Himalayan and Eurasian Griffons, Golden Eagle)	High	Medium	Low	Minor

Adverse Impact	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Collision with powerlines – high sensitivity collision-prone birds (White-headed Duck, Sociable Lapwing, Arctic Loon, Egyptian Vulture, Greater Spotted Eagle, Steppe Eagle, Imperial Eagle, Saker Falcon)	Medium	High	Low	Moderate
Collision with powerlines – medium sensitivity collision-prone birds (Great White and Dalmatian Pelicans, Bearded and Cinereous Vultures, Himalayan and Eurasian Griffons, Golden Eagle)	Medium	Medium	Low	Minor
Collision with powerlines – low sensitivity collision-prone birds (Demoiselle and Common Cranes, other migratory waterbirds)	Medium	Low	Low	Neutral
Disturbance/Displacement – high sensitivity terrestrial vertebrates and birds	Low	High	Low	Moderate
Disturbance/Displacement – medium sensitivity terrestrial vertebrates and birds, including nesting Golden Eagles and Himalayan Griffons	Low	Medium	Low	Minor
Disturbance/Displacement – low sensitivity terrestrial vertebrates	Low	Low	Low	Neutral
Injury/death – high sensitivity terrestrial vertebrates	Low	High	Low	Moderate
Injury/death – medium sensitivity terrestrial vertebrates	Low	Medium	Low	Minor
Injury/death – low sensitivity terrestrial vertebrates	Low	Low	Low	Neutral

7.14.7 Data limitations and uncertainty

The robustness and certainty of the biodiversity impact assessment conclusions presented within this section are limited by heterogeneity in the extent of existing scientific knowledge regarding sensitive species' distributions, ecology, and susceptibility to impacts from powerlines within Kyrgyzstan.

7.15 Cultural heritage

7.15.1 Construction phase

Archaeological surveys have been completed and show a large number of areas of archaeological importance along the Project RoW and near to the location of the of the Balykchy substation. Kyrgyz legislation requires that a buffer of 50m is maintained for construction from the location of an archaeological site.

Kurgans are not always easily identified. Some look like grass covered mounds and may not be easily identifiable as archaeological sites, particularly to expatriate workers, that may not have such items in their home country. Therefore, there is a risk that archaeological sites close to Project construction, could be unknowingly damaged.

Excavation work during the construction phase will take place at the tower foundation locations and for the substation. The substation is located entirely outside the 50m buffer zone for nearby kurgans and therefore no impact on kurgans from the construction of the substation is anticipated. The magnitude of the impact from substation construction is considered LOW.

Based on the current routing all except one angle tower has been identified as outside the 50m buffer zone and the mapping shows that micro siting of the remaining towers between each angle tower can be done to also avoid encroaching to within the 50m buffer zone. Mitigaiton to address the tower encroaching to within 50m of the kurgan will be required. The magnitude of the impact from tower siting is considered HIGH.

Minimal excavation work is expected for the road access, or along the ROW between towers. Given the large number of kurgans in the area, there is the possibility that the access roads may need to encroach within 50m of the identified kurgans and there is also the possibility that there are unidentified kurgans (or other feature of archaeological significance) that could be uncovered during construction. The magnitude of the impact from access road construction is considered HIGH.

Consultation with the local community has not identified any potential intangible cultural heritage that may be impacted by the proposed works.

7.15.2 Operations phase

During the operations phase no below ground works are anticipated. Maintenance works along the OHTL are not expected to impact items of unidentified cultural heritage. Consultation with the local community has not identified any potential intangible cultural heritage association that may be impacted by the proposed works or the ongoing presence of infrastructure near to the identified kurgans.

7.15.3 Decommissioning phase

During decommissioning (substation, OHTL) no below ground excavation works in areas not previously directly impacted or surveyed is expected. Any previously unidentified finds that are noted during the construction phase will be required to be demarcated for protection during decommissioning works where they may fall within the direct AOI.

7.15.4 Summary of impact magnitude

Activity	Intensity/ compliance	Duration	Spatial Extent	Reversibility	Likelihood	Magnitude (pre-mitigation)
Construction work within 0 – 50 m buffer zone	Medium	Short-term	Direct AOI	Reversible – impact is removed once the work is completed.	High	Medium
Construction work within 50 – 150 m buffer zone	Medium	Short-term	Direct AOI	Reversible – impact is removed once the work is completed.	High	Medium
O&M works near to remaining Kurgans	Low	Long-term	ROW	Irreversible (OHTL will be a presence for at least 25 years)		Low
Decommissioning work within 0 – 50 m buffer zone	Medium	Short-term	Direct AOI	Reversible – impact is removed once the work is completed.	High	Medium
Decommissioning work k within 50 – 150 m buffer zone	Medium	Short-term	Direct AOI	Reversible – impact is removed once the work is completed.	High	Medium

7.15.5 Receptor sensitivity

The AOI for potential cultural heritage impacts identified for the planned works is defined as the areas of cultural heritage identified in the archaeology report, that are located near the RoW and Balykchy substation, the Project footprint where below-ground work may take place, specifically the tower foundation locations and the Balykchy substation. Sensitive receptors in the AOI are summarised in Table 119.

Table 119: Project cultural heritage receptors

OHTL	**Sensitivity**
Known cultural heritage in the AOI (Kurgans)	High
Unidentified cultural heritage in the direct AOI	Medium

7.15.6 Mitigation, management measures

Table 120 outlines GIP and feasible and cost-effective measures to prevent or minimise impacts on locations or items of physical cultural heritage.

Table 120: Cultural heritage mitigation and management

Project phase	Mitigation and management measures
Design/Contract	• Prepare Project design to avoid the 50m buffer zone of all known areas of cultural heritage and archaeological significance where possible. • Include requirement for a chance finds procedure in the Project contract.
Project Specific	• Consider options to relocate the known angle tower that sits within 50m of a kurgan (noting this may have resultant impacts to the alignment of the line that may raise other impacts) (refer to archaeological report in Volume III). • Develop a Protection Zone Plan (hereinafter – PZP[139]) incorporating the following protections applicable during the construction works. For sites within the 0–50 m buffer, the PZP must be developed by a restoration architect. For sites within the 50–150 m buffer, the PZP

139 This can be considered the Project Cultural Heritage Management Plan.

Project phase	Mitigation and management measures
	must be developed by an accredited archaeologist. The Protection Zone Plan is approved by the Ministry of Culture. • If a 50m buffer cannot be maintained conduct a "Salvage Investigation" to determine whether construction works can proceed without excavation. If preservation of the site is not possible, an Excavation and/or Relocation Plan for Archaeological Sites must be developed and implemented under the supervision of an archaeologist. • In addition to recommendations that may arise from the Salvage report, all features within 50m of planned work (tower, substation or access road) must erect a cordon to reflect the 50m buffer zone, including clear signage, to protect the buffer zone and ensure no project vehicles encroach into the 50m protection zone. • An archaeologist to be present during all excavation works (as defined in the PZP). • Prepare a project chance finds procedure and watching brief as part of the EPC ESMS for all below-ground works, including overhead line transmission, substation, and access roads (both permanent and temporary). Should items of cultural heritage be identified they should be managed in line with the chance find procedure and reflect the possible need for a PZP and a Salvage Investigation.
Good International Practice	• Include training on chance finds procedure in the Site Induction (induction and TBT) • Undertake training on chance finds (CFs) • Undertake awareness raising activities, including presentation of maps during the onboarding of all subcontractors, to identify areas of known cultural heritage sites, and procedures in place to protect the sties. • Provide training (during induction and regular refresher training) to all workers on the locations of known cultural heritage sites, and no-go areas. • Ongoing discussion with local community members if they have any areas of cultural significance within the proposed Project site and avoid any areas that are identified.
Operation	• None noted.
Enhancement	• Train workers in the identification of items of cultural heritage or

Project phase	Mitigation and management measures
	features of archaeological significance.
Monitoring	• Log and report all chance finds identified • Should items of cultural heritage be found near the proposed project site, these should be regularly monitored to ensure they are properly signposted, their buffer zones are maintained and that no harm has come to the items. • Training should be provided to workers on the location of such items and the proper behaviour around the items of cultural heritage.

7.15.7 Residual significance

Following the application of the mitigation measures outlined in Table 120, the possibility of items of cultural heritage being lost or destroyed (the magnitude of the impact) is expected to reduce. The residual significance post mitigation is summarised in Table 121. The assessment has indicated that cultural heritage impacts due to the construction phase of the Project would not be significant.

Table 121: Cultural heritage residual significance

Impact	Magnitude pre-mitigation	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Disturbance of unidentified cultural heritage	Medium	Medium	Low	Minor
Disturbance of identified cultural heritage	Medium	High	Low	Moderate

7.15.8 Data limitations and uncertainty

None identified.

8 Environmental and Social Management

8.1 Overview

A framework ESMP is prepared as part of the ESIA to support the ongoing implementation of E&S requirements for the Project (Volume IV ESMP). The objectives of the ESMP are to:

- Clearly describe the required components of the NEGK and Contractors environmental and social management system (ESMS) for the construction and operation phase.
- Provide overview of the NEGK corporate structure for implementing projects.
- Confirm compliance obligations.
- Establish objectives of the ESMP (construction and operation).
- Define roles and responsibilities for implementation of the requirements of the ESMP.
- Outline capacity building and training requirements (all parties) (linked to the ESAP).
- Set minimum requirements for inspection, audits and reporting.

8.2 ESMP objectives

A summary of the key obligations from the ESIA phase is provided below. These will be elaborated in the ESMP to provide further information on:

- outcomes or targets;
- timeframes;
- responsibilities;
- resources required;
- monitoring activities.

9 Conclusion

9.1 Key conclusions

9.1.1 Stakeholder engagement

- A systematic approach to stakeholder engagement has been employed that has sought to build a constructive relationship with stakeholders, particularly the directly affected communities.
- Stakeholder engagement and consultation has been performed throughout the ESIA process following the requirements set out in the SEP (Volume V).
- Outputs from the consultation process have been integrated into the ESIA and recorded in the **Public Consultation Report** which is appended to the SEP.
- A program for effective engagement going forward is set out in the Project Stakeholder Engagement Plan (SEP) alongside a project community grievance mechanism.

9.1.2 Environmental

- The Project is susceptible to climate related risks including heatwaves, landslides and drought which impact physical infrastructure and worker health. The ESIA has defined climate resilient design choices and appropriate emergency response planning to address these matters.
- Sustainable land clearance practices and rehabilitation and restoration actions are required to ensure disturbed areas of land are not degraded with the potential for soil erosion.
- The Project may generate negative environmental impacts from the use of hazardous materials, or poor waste management, however these can be mitigated or managed to acceptable levels as set out in the Project Environmental and Social Management Plan (ESMP), Volume IV.
- The Project will have a negligible impact on AQ, noise, groundwater levels, and water availability, water quality, and transportation infrastructure in the local region. To ensure this, GIP techniques for management and mitigation of impacts have been defined in the ESIA and ESMP to ensure receptors within 200m of the ROW, gravel road users, livestock users and commercial and residential receptors near the ROW are protected.
- EMF risks are deemed to be negligible, but awareness campaigns must be considered based on community perceptions about risk.

9.1.3 Biodiversity

- The OHTL does not pass through any legally protected areas (LPA) or Internationally Recognized Areas (IRA, including Key Biodiversity Areas, KBA).
- No impacts from construction, operation, or decommissioning will occur on any LPA or IRA. Impacts on these areas are not considered further.
- Seven plant species with protected status are classified as PBF for the Project, subject to a "no net loss" mitigation standard, of which three species were documented within the Project area
- Few alien species occur in the area, and none are very widespread.
- only reptile or amphibian identified as a PBF for the Project is the Asian Frog *Rana asiatica*. It was not detected in the area during the baseline surveys, but it is considered possible that it could occur there, particularly in proximity to small water bodies and patches of woodland located along the riparian corridors of the Chu River and major tributaries (Konorchok, Kok-Moynok Rivers) through which the OHTL passes.
- Only two species of mammal have been classified as PBF for the Project, and neither one was documented in the area during the baseline survey (Marbled Polecat, Snow Leopard), indicating that these species are rare in the Project area, if they occur at all.
- Sensitive species of raptors and vultures that nest within the area include Golden Eagle *Aquilla chrysaetos* and Himalayan Griffon *Gyps himalayensis*.
- Five species of fish have been identified as PBF for the Project, on the basis that they i) have sensitive status or satisfy another EBRD PBF criterion, and ii) may occur in the rivers

that are crossed by the Project's OHTL in three places, including for spawning.
- the baseline studies indicated that no collision-prone bird species occur in high abundance within the Project area, including during migration seasons. Individual species defined as PBF for the Project that may be susceptible to OHTL collision impacts include White-headed Duck, Demoiselle and Common Cranes, Sociable Lapwing, Arctic Loon, and Great White and Dalmatian Pelicans.

9.1.4 Labor and Social

- Occupational health and safety risks will require a comprehensive Construction HSMS and OHS Plan for the OHTL works.
- Labour matters and supply chain matters which are crucial to the successful development of the Project will be managed by setting out key obligations on suppliers and contractors in contractual documentation.
- Local employment and procurement will be prioritised where possible. However, awareness raising will be necessary in the local communities to manage expectations as the numbers of opportunities will be low.
- Temporary worker accommodation requirements will be managed by ensuring housing standards are aligned with GIP as defined by EBRD and other Lenders.
- Community health and safety risk are deemed to be low however the Project will implement awareness raising activities to inform local community members of the outcomes of the findings of the ESIA relating to EMF, recruitment, health and safety, communicable diseases, and the cultural heritage assessments.
- All workers (including security personnel) will be required to sign a worker's code of conduct that includes obligations for recognising the potential for GBV risks exacerbated by the Project.
- Several kurgans (graves) were identified along the OHTL ROW. Archaeological surveys and the development of a Protection Zone Plan (and supporting plans) should be performed along the Kemin-Balykchy OHTL to confirm potential risk to archaeological and cultural features and provide proposed mitigation and management measures within 0-50m and 50 to 150m as per national regulations.
- Where possible, infrastructure will be placed outside the protection zone (0 to 50m) for kurgans.

9.1.5 Land

- The Project will not result in any physical displacement impacts.
- There will be some permanent and temporary land take for the Project that may result in adverse impacts on livelihoods for local farmers, herders and community members.
- Livelihood impacts are not expected to be significant and livelihood restoration measures are outlined in the Project LARF to address loss of land or income resulting from the construction works or the presence of the OHTL.

Overall, the ESIA concludes that the Project represents a priority infrastructure for Kyrgyz Republic. The Project is an effective and viable energy infrastructure project for the country.

The measures outlined in this ESIA enable the Project to avoid, or where avoidance is not possible, minimise, mitigate or compensate adverse environmental or social impacts and issues to workers, affected communities and persons, and the environment from Project activities, including biodiversity impacts to acceptable levels.

Key commitments outlined in this ESIA and ESMP have been incorporated into the Lender Environmental and Social Action Plan (ESAP) that will be appended to the loan agreement.

9.2 Summary of Impacts

Summary of residual impact for all aspects is provided in Table 122.

Table 122: Summary of impacts

Adverse impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Construction dust (site establishment, vehicles movements, cement batching)	Medium	Medium (within 200m of the site) Low (outside 200M)	Low	Minor (Neutral all other receptors)
Fugitive exhaust emissions	Medium	Medium	Low	Minor (Neutral all other receptors)
Decommissioning dust (site establishment, vehicles movements, cement batching)	Medium	Medium (workers all other receptors Low)	Low	Minor (Neutral all other receptors)
Decommissioning fugitive exhaust emissions	Medium	Medium	Low	Minor (Neutral all other receptors)
Construction dust (site establishment, vehicles movements, cement batching)	Medium	Medium (within 200m of the site) Low (outside 200M)	Low	Minor (Neutral all other receptors)
Fugitive exhaust emissions	Medium	Medium	Low	Minor (Neutral all other receptors)
Decommissioning dust (site establishment, vehicles movements, cement batching)	Medium	Medium (workers all other receptors Low)	Low	Minor (Neutral all other receptors)

Adverse impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Decommissioning fugitive exhaust emissions	Medium	Medium	Low	Minor (Neutral all other receptors)
Construction site works (clearance, ground works, erection)	Medium	Medium	Low	Minor
Construction traffic movements	Medium	Medium	Low	Minor
Decommissioning site works	Medium	Medium	Low	Minor
Decommissioning traffic movements	Medium	Medium	Low	Minor
General waste management (construction)	Medium	Medium	Low	Minor
Hazardous waste management (construction)	Medium	Medium	Low	Minor
Health impacts on workers and community	Low	Low	Low	Negligible
General waste management (decommissioning)	Medium	Medium	Low	Minor
Operational waste (general)	Low	Low	Low	Neutral
Decommissioning waste (general)	Medium	Medium	Low	Minor
Increased wind speeds (Physical infrastructure)	Medium	Medium	Low	Minor
Increasing temperature (Physical infrastructure)	Medium	Medium	Low	Minor
Extreme rain events (Physical infrastructure)	Medium	Medium	Low	Minor
Climate related events that impact worker health (all phases)	Medium	High	Low	Moderate
Water use (construction)	Medium	Medium	Low	Minor
Water quality (surface water features)	Medium	Medium	Low	Minor
Wastewater discharges (sanitary wastewater)	Medium	Medium	Low	Minor
Water quality (streams) – decommissioning	Medium	Medium	Low	Minor
Water resource –decommissioning	Medium	Medium	Low	Minor
EMF occupational exposure on workers	Low	Medium	Low	Minor
EMF exposure – the general public	Low	High	Low	Moderate
EMF exposure – livestock, natural habitats	Low	Low	Low	Neutral

Adverse impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Construction – loss of vegetation cover	Medium	Low - Medium (Kok-Moynok canyon)	Medium	Neutral to Minor
Construction nuisance visual impacts (vehicles, access roads)	Medium	Low - Medium (Kok-Moynok canyon)	Medium	Neutral to Minor
Operation – permanent removal of existing vegetation	Medium	Low - Medium (Kok-Moynok canyon)	Medium	Neutral to Minor
Operation – presence of towers, OHL, ROW creating visual impact	High	Low - Medium (Kok-Moynok canyon)	High	Moderate to Major
Operation – cumulative impacts "wirescape"	High	Low - Medium (Kok-Moynok canyon)	High	Moderate to Major
Decommissioning - Presence of the removal plant and associated structures	Medium (positive)	Low - Medium (Kok-Moynok canyon)	Medium	Minor to Moderate (positive)
Decommissioning Visual effect of removal plant and associated structures.	Medium (Positive)	Low - Medium (Kok-Moynok canyon)	Low	Minor to Moderate (positive)
Construction impacts - Road infrastructure condition	Low	Medium	Low	Minor
Construction impacts on road users/ communities (unsurfaced roads) (e.g. Kok-Moynok-2)	Medium	High	Low	Moderate
Construction impacts on road users (general)	Low	Low	Low	Insignificant
Decommissioning impacts on road users/ communities (unsurfaced roads) (e.g. Kok-Moynok-2)	Low	Low	Low	Insignificant

Adverse impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Decommissioning impacts on road users/ communities (unsurfaced roads) (e.g.Kok-Moynok-2)	Medium	High	Low	Moderate
Local job creation	Medium	Medium	Medium	Moderate (positive)
Local Procurement and spending	Medium	Medium	Medium	Moderate (positive)
Working conditions and wellbeing – NEGK workers	Low	Low	Low	Neutral
Working conditions and wellbeing skilled contract workers	Low	Medium	Low	Minor
Working conditions and wellbeing – local workers	Low	High	Low	Moderate
Working conditions and wellbeing unskilled/migrant contract workers	Medium	High	Low	Moderate
Unsatisfactory/non-compliant worker accommodation	Medium	High	Low	Moderate
GBVH in the workplace	Low	High	Low	Moderate
Working conditions and wellbeing – supply chain workers	Medium	High	Low	Moderate
Safety risks for members of the communities within 15km of the Project and herders	Medium	Medium	Low	Minor
Labour influx	Low	Medium	Low	Minor
Poor worker conduct (inc., GBV – at-risk behaviour)	Low	Medium	Low	Minor
Tourism impacts (C/O/D)	Medium	Medium	Low	Minor
Loss of Livelihood due to land take – privately owned farms (C/O)	Medium	Medium	Low	Minor
Loss of Livelihood – herders and employees (C/O)	Medium	High	Low	Moderate
Loss of Livelihood – businesses (C/O)	Medium	Low	Low	Neutral
Loss of ecosystem services	Medium	Low	Low	Neutral
Loss of income from tourism	Medium	Low	Low	Neutral
Habitat loss/degradation – natural vegetation communities	Medium	Low	Low	Neutral
Direct loss – PBF plant species	Medium	Medium	Low	Minor
Introduction of invasive species, impact on natural vegetation communities	Low	Low	Low	Neutral

Adverse impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Habitat loss/degradation – high sensitivity terrestrial vertebrates and birds	Medium	High	Low	Moderate
Habitat loss/degradation – medium sensitivity terrestrial vertebrates and birds	Low	Medium	Low	Minor
Habitat loss/degradation – low sensitivity terrestrial vertebrates and birds	Low	Low	Low	Neutral
Indirect impacts on medium sensitivity fish	Medium	Medium	Low	Minor
Indirect impacts on low sensitivity fish	Medium	Low	Low	Neutral
Disturbance/Displacement – high sensitivity terrestrial vertebrates and birds	Low	High	Low	Moderate
Disturbance/Displacement – medium sensitivity terrestrial vertebrates and birds, including nesting Golden Eagles and Himalayan Griffons	Low	Medium	Low	Minor
Disturbance/Displacement – low sensitivity terrestrial vertebrates and birds	Low	Low	Low	Neutral
Injury/death – high sensitivity terrestrial vertebrates and birds	Low	High	Low	Moderate
Injury/death – medium sensitivity terrestrial vertebrates and birds	Low	Medium	Low	Minor
Injury/death – low sensitivity terrestrial vertebrates and birds	Low	Low	Low	Neutral
Electrocution – high sensitivity electrocution-prone birds (Egyptian Vulture, Greater Spotted Eagle, Steppe Eagle, Imperial Eagle, Saker Falcon)	High	High	Low	Moderate
Electrocution – medium sensitivity electrocution-prone birds (Bearded and Cinereous Vultures, Himalayan and Eurasian Griffons, Golden Eagle)	High	Medium	Low	Minor
Collision with powerlines – high sensitivity collision-prone birds (White-headed Duck, Sociable Lapwing, Arctic Loon, Egyptian Vulture, Greater Spotted Eagle, Steppe Eagle, Imperial Eagle, Saker Falcon)	Medium	High	Low	Moderate

Adverse impacts	Magnitude (pre-mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Collision with powerlines – medium sensitivity collision-prone birds (Great White and Dalmatian Pelicans, Bearded and Cinereous Vultures, Himalayan and Eurasian Griffons, Golden Eagle)	Medium	Medium	Low	Minor
Collision with powerlines – low sensitivity collision-prone birds (Demoiselle and Common Cranes, other migratory waterbirds)	Medium	Low	Low	Neutral
Disturbance/Displacement – high sensitivity terrestrial vertebrates and birds	Low	High	Low	Moderate
Disturbance/Displacement – medium sensitivity terrestrial vertebrates and birds, including nesting Golden Eagles and Himalayan Griffons	Low	Medium	Low	Minor
Disturbance/Displacement – low sensitivity terrestrial vertebrates and birds	Low	Low	Low	Neutral
Injury/death – high sensitivity terrestrial vertebrates and birds	Low	High	Low	Moderate
Injury/death – medium sensitivity terrestrial vertebrates and birds	Low	Medium	Low	Minor
Injury/death – low sensitivity terrestrial vertebrates and birds	Low	Low	Low	Neutral
Disturbance of unidentified cultural heritage	Medium	Medium	Low	Minor
Disturbance of identified cultural heritage (within 0 to 150m)	Medium	High	Low	Moderate